JULY 15, 1960
Price 50c

TELEPHONE ENGINEER & MANAGEMENT

the telephone industry magazine

V.64 #14

Featuring

CENTS-LESS ACCOUNTING
By G. M. Jones

FUNDAMENTALS OF VNL
By C. D. Ehinger

PLANT ENGINEERING NOTES
By John S. Reed

THE TRAFFIC ENGINEER –MATHEMATICIAN AND PROPHET
By D. A. Perigo

SLUGS IN THE COIN BOX
By Allan R. Stacey

NEW PRODUCTS SHOWCASE
By Dick Reynolds

SEE TABLE OF CONTENTS
Page One

Celebrating

OUR

YEAR

For fifty years of progress, we gratefully acknowledge the role played by our customers in our growth and development. Their sustained support and approval have given us a vote of confidence year after year, which has inspired our efforts toward the achievement of the highest standards of service. In appreciation, we rededicate ourselves to continuing the highest standards of service during future years as the telephone industry continues to progress.

1910 - 1960

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TELEPHONE ENGINEER & MANAGEMENT

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TELEPHONE ENGINEER & MANAGEMENT

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VOL. 64 NO. 14 JULY 15, 1960

CONTENTS

ACCOUNTING
"Cents-Less Accounting" — Dr. G. M. Jones — 41

ASSOCIATIONS
Wisconsin State Tel. Assoc. Notes Half Century of Progress — 63
Illinois Association Holds 55th Annual Convention — 68
Tharp Named to Succeed Hardy as Illinois Secretary — 79
Coming Telephone Association Conventions — 89

COMMERCIAL DEPARTMENT
Slugs In The Coin Box — Allan R. Stacey — 54

ELECTRONICS
Electronic Communications — 48
Electronics Notebook — Leo G. Sands — 49

FINANCIAL
Communications Securities — 16

NEWS & COMMENT
Letters From Readers — 11
Industry Newsletter — 17
Industry Observations — L. A. Gritten — 22
Washington Observations — Roland Davies & Fred Henck — 27
Industry Views — 30
Industry News Briefs — 80
The Back Of The Book — John G. Reynolds — 98

PLANT DEPARTMENT
Fundamentals of VNL (Part IV) — C. D. Ehinger — 46
Plant Engineering Notes — John S. Reed — 56
Dehydrators Reduce Trouble Reports For United Tel. Co. — 70

PRODUCTS & SERVICES
New Outside Booth Light — 60
New Products' Showcase — Dick Reynolds — 73
Telephone Market Place (Classified Advertising) — 87
Advertisers' Index — 97

TRAFFIC DEPARTMENT
The Traffic Engineer — Mathematician and Prophet — D. A. Perigo — 44

FRONT COVER

Charles P. Kirby (right), vice president of the New Jersey Telephone Co., Flemington, N. J. and Cableman Bruce Baily inspect compressor dehydrator that supplies air to approximately 100 miles of cable. For complete story see page 70.

Volume 64, No. 14. Published on the 1st and 15th of each month by TELEPHONE ENGINEER PUBLISHING CORP., 7720 Sheridan Rd., Chicago 26, Ill. Subscriptions, U. S. and Possessions, $4.00 per year; Canada, $4.50; in all other countries, $6.50. Single copies, U. S. A., 50 cents. Entered as Second Class matter at the post office at Rochelle, Ill. under the act of March 3, 1879. Copyright 1960 by Telephone Engineer Publishing Corp., 7720 N. Sheridan Rd., Chicago 26, Ill.

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Bury your maintenance costs with Anaconda PCP and PCPG cables

Direct burial offers many cost-cutting possibilities – (1) freedom from storm damage, (2) freedom from tree-clearing and retrimming expenses, (3) freedom from the hazards associated with power contacts and pole climbing, (4) freedom from right-of-way procurement difficulties.

Anaconda PCP and PCPG cables offer you *extra* cost-cutting features. Here are a few of them:

1. Outstanding resistance to lightning damage – a copper shield and a high-molecular-weight polyethylene belt over the core make the over-all cable highly resistant to lightning damage. The high-molecular-weight polyethylene conductor insulation protects against ductor-to-conductor lightning damage.

2. Water vapor will not cause failure – be of the excellent moisture resistance of the high-mole weight polyethylene insulation.

3. Full color coding – makes for low-cost install by fast, easy splicing and terminating. Eliminates test ing. All it takes is a one-man crew. And – all these a tages are repeated every time you add or change term

4. Easy handling – this lightweight cable wi rugged corrugated shield permits easy handling duri

stallation, plowing, and burial.

Should you select PCP or PCPG?

The difference between Anaconda PCP and PCPG cables is a difference in thickness of the corrosion-resisting, low-resistance copper shield. PCP cable, having a 0.005-inch shield, is intended to withstand attack by termites and small rodents, such as field mice. PCPG cable, with a 0.010-inch shield, is for use in areas where gopher attack is a possibility.

Find out if direct burial of Anaconda PCP or PCPG cable can help you reduce your operating and maintenance costs.

Call your nearest Anaconda district office direct. Or write: The Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

60245

PHONE THE MAN FROM

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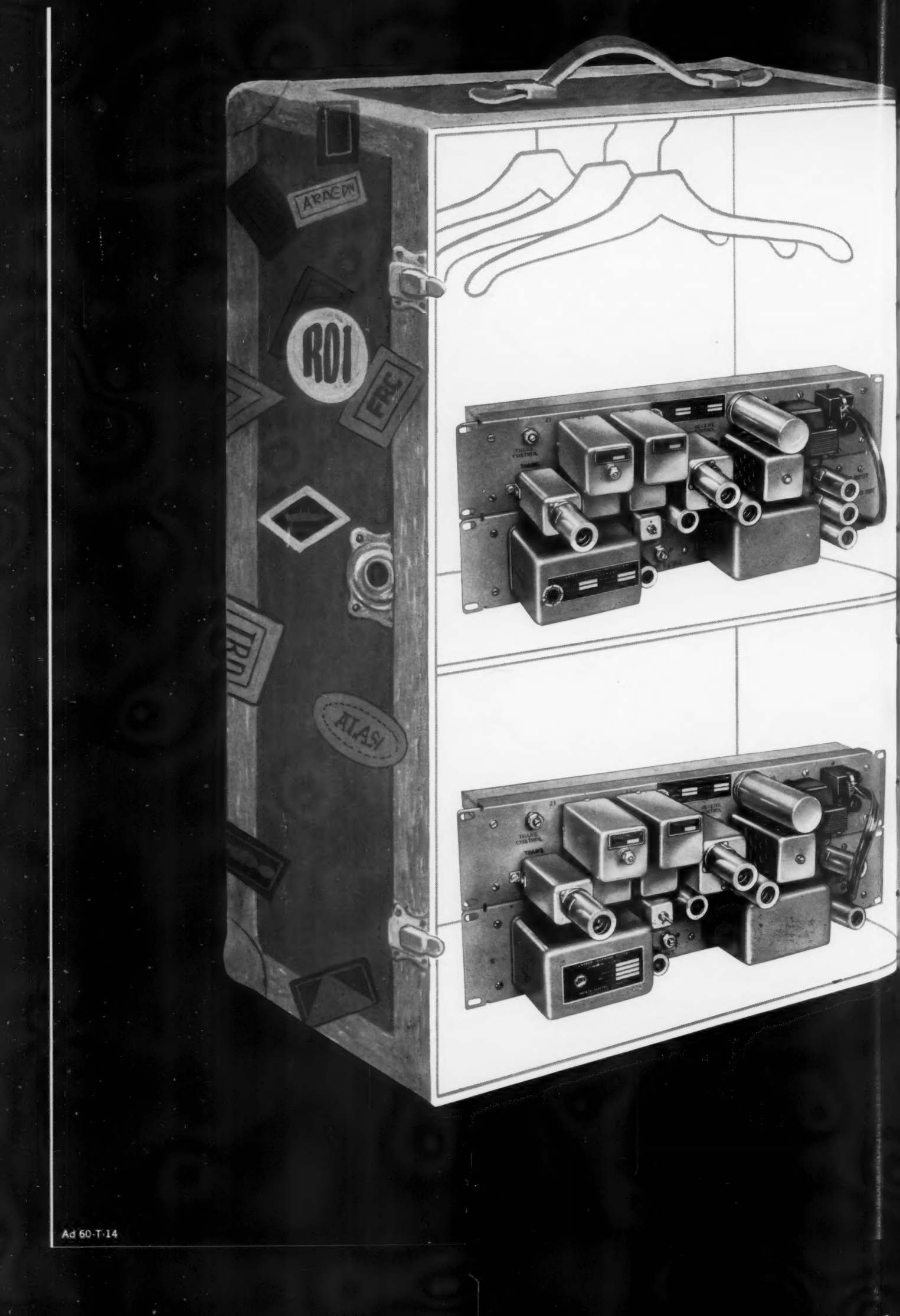
FOR PCP AND PCPG TELEPHONE CABLE

the independent manufacturer
for the independent telephone industry



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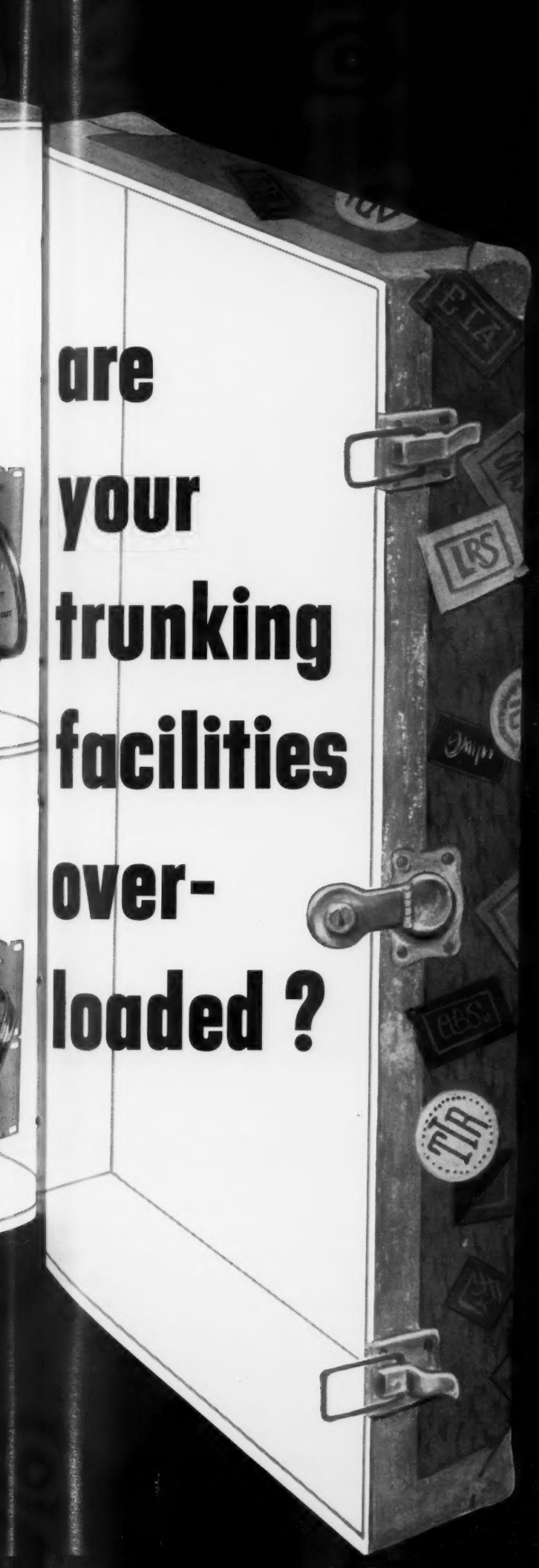


are your trunking facilities over-loaded?

You can have additional trunking facilities without the burden of physical line construction!

The answer, of course, lies in North NT-101 E & M Trunk Carrier or NT-102 Ringdown Trunk Carrier!

New, improved North Trunk Carrier is low in cost.

New, improved North Trunk Carrier has simplified circuitry for easier maintenance.

All North Carrier is built on common interchangeable chassis.

All North Carrier is built with new silicon rectifiers.

All North Carrier is equipped for either cable or open line wire termination.

Let your North Carrier Engineer show you what North Carrier can do for you—NOW. (And ask him for full details on North's Carrier Schools for your personnel.)

Whatever your telecommunication problems may be, look first to

THE DYNAMIC FORCE IN THE TELEPHONE INDUSTRY

NORTH ELECTRIC COMPANY

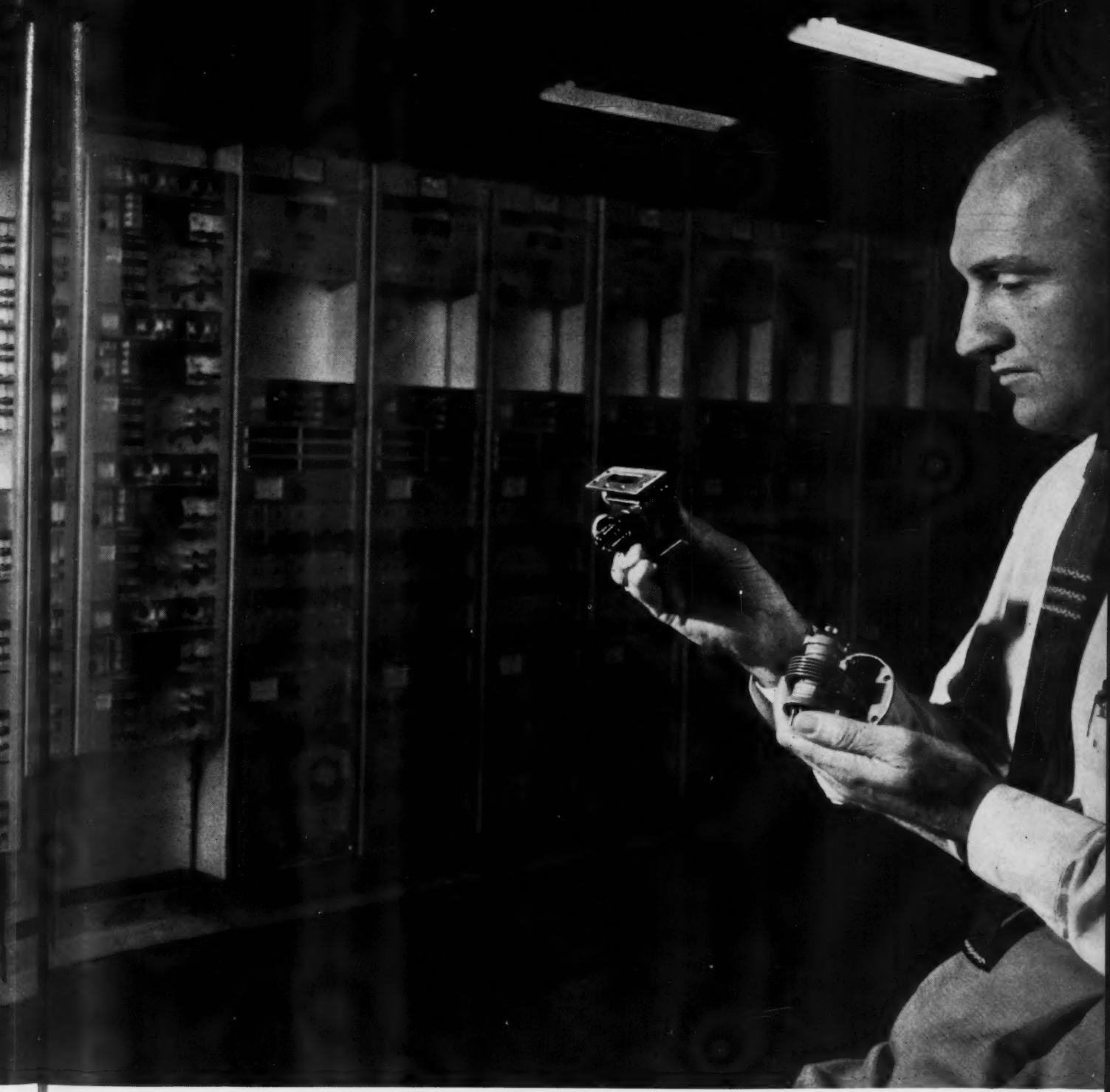
Galion, Ohio

Why you get more from Lenkurt Type 74A microwave–

Only *Lenkurt* microwave has tomorrow's fr

The Federal Communications Commission has proposed an immediate tightening of microwave frequency tolerances from today's ± .05% to ± .005%. Industry representatives have counter-proposed an immediate reduction to ± .02%, with a further reduction to ± .01% in 1965.

Lenkurt Microtel microwave equipment, alone, *already* meets the ± .02% requirement *without modification or additional equipment*. In fact, *existing* installations, with only a minor modification, will be able to hold a tolerance *better* than ± .01% . . . *better* than the industry's recommendation for 1965!



's frequency stability already built in

Lenkurt Microtel achieves this performance because circuits and components were designed with tomorrow in mind. The heavy-duty one-watt klystron and the Invar reference cavity, for instance, neither use nor require temperature control to meet specifications. And automatic frequency control of the transmitter is *standard* on Lenkurt Microtel . . . it's not even available on most other microwave systems!

Our customers have come to expect such advanced thinking and engineering in all Lenkurt telecommunications products. Such "engineering for the future" saves you money, both in freedom from obsolescence and in greatly reduced maintenance expense.

With a complete product line, our experienced staff engineers are able to plan your systems efficiently and objectively. Call or write your nearest Automatic Electric representative, or the Director, Carrier & Radio Sales, Automatic Electric Sales Corporation, Northlake, Illinois.

AUTOMATIC ELECTRIC

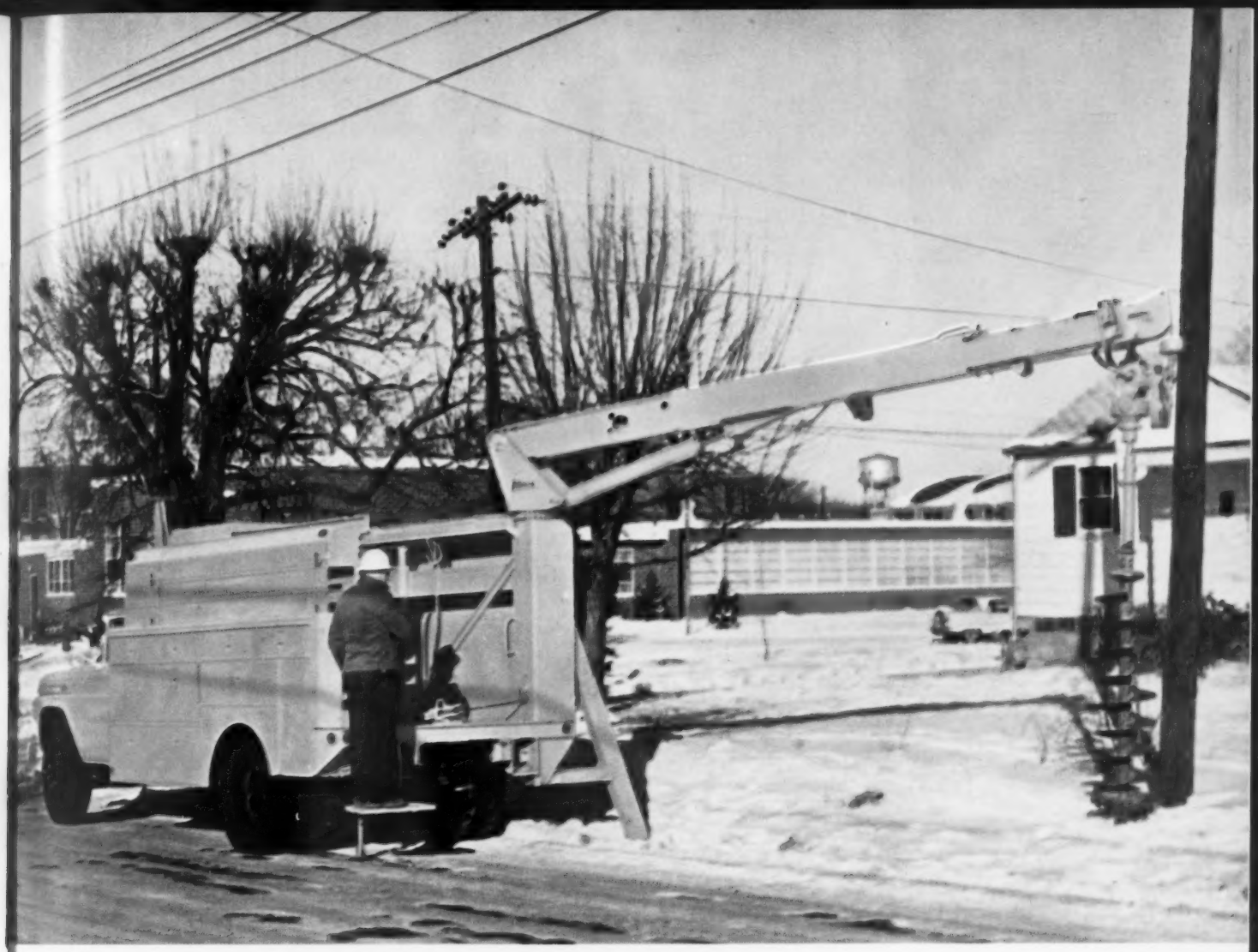
Subsidiary of

GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM

This is the SYMBOL of Pitman

and its completely new concept in hydraulic equipment designed especially for the telephone industry



replace muscle with the new

PITMAN POLECAT™

...makes your operator a one-man gang!

Community demand is growing by leaps and bounds. Your expansion program will have to hustle to keep up with it—and the way to do this is *not* by adding costly muscle-power . . . but through a fleet of versatile Pitman Polecats!

The all-hydraulic Polecat is much more than just another modified A-frame. It combines the functions of a digger, derrick *and* insulated crowsnest . . . does all three better than single-purpose units on the market. It makes best use of skilled men, eliminates more specialized vehicles; yet, with all its unique flexibility and performance, the Polecat is sensibly priced. It will quickly pay for itself—many times over—in increased crew efficiency.

This compact unit can be used with almost any utility line body, new or in-use. It can be center-mounted behind the cab, or installed in either rear corner, according to your individual requirements. Turn this page for more details . . .

the new

PITMAN POLECAT™

...changes its skills to match the job at hand!

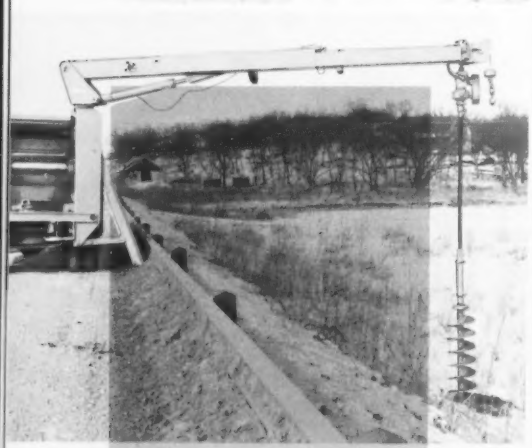
Digs all these holes from one truck position! Boom rotates 360° in either direction, digs holes in a circle from 24′ to 40′ in diameter. Digger head transfers instantly from basic boom to extendible tip simply by pulling and replacing a steel pin. Operator digs precisely, close to obstructions. Boom-tip inches in or out to keep hole straight. Same control digs holes for dead-end anchors, angling in any direction.

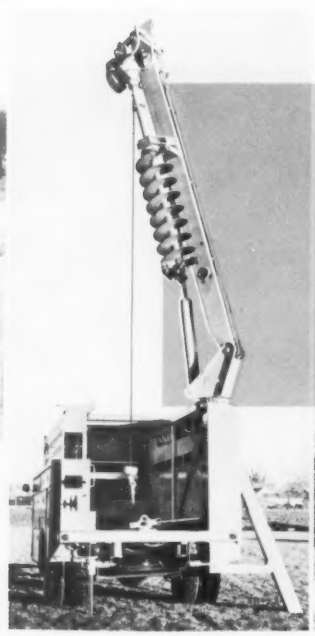
Auger hurdles walls, hedges, ditches, fences! With digger pinned to extended boom, Polecat reaches over guard rail to dig at foot of steep bank. Telescoping extension, built into digger shaft, permits full-depth holes far below road level. Hydraulic down-pressure sufficient to chew through frost, shale, hardpan.

Doubles as hydraulic derrick, loads its own truck bed! With digger stowed and pinned to basic boom, "stinger" can extend from 14′ to 22′ as a derrick. Reaches over obstructions to lift 8,000 lbs. Deck stays clear for materials.

Boom reaches 32 feet up, under full load, to lift replacement pole into position. Handles 40′ to 60′ poles easily. "Stinger" inches in or out to position heavy transformers on poles, too. Boom revolves, raises and extends simultaneously. Control panel in a choice of locations.

Fiberglass boom extension locks into extendible boom-tip, supports one or two fiberglass buckets for work on hot lines. Non-conductive rope runs over sheave in end of extension, lifts transformers up to 40′ above ground.





If you'd like to see this remarkable machine in action, your Pitman Distributor will be glad to oblige with a thorough demonstration. Or, simply contact . . .

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LETTERS FROM READERS

"Depreciation"

TO THE EDITOR: — "Is there a possibility of being able to obtain a reprint of all the chapters in your series of 'Depreciation' articles by Dr. G. M. Jones? If there is not that possibility, then can we obtain Chapter I and II? Those are the chapters that we are missing and we are anxious to get ahold of. If there is a charge, please bill us. Thank you."

Stella Lorenz,
Librarian,
The American Appraisal Co.,
525 *E. Michigan St.,*
Milwaukee 1, *Wis.*

Report To Executives

TO THE EDITOR: — "We have availed ourselves of your open invitation to reprint the editorial, 'The New Competition,' which appeared in the April 15, 1960 issue of your magazine. Two hundred fifty copies have been made in the form of the attached four copies, as a part of a report to our executives regarding our sales activities. Your courtesy in granting this permission is very much appreciated."

Edgar A. Farnum,
General Sales & Servicing Manager,
New England Tel. & Tel. Co.,
185 *Franklin St.,*
Boston 7, *Mass.*

"A Good Job — Well Done"

TO THE EDITOR: — "It has long been my opinion, and the Missouri Telephone Communications Association (MTCA) is aiming toward this goal, that telephone companies should assist one another in cases of emergencies in as large a measure as possible. What might be considered routine damage in a large company can very easily be a major emergency to a smaller one.

"Our first opportunity to 'practice what we preach,' came recently. The story is being passed to you with the thought that such publicity might encourage more cooperation within the industry in such emergencies.

"V. L. Freeman, REA Field Engineer, was in attendance at the MTCA opening session, May 17, when Guy Thorne of La Belle, Mo., called him and told of the damage to his exchange the night before by a tornado. La Belle has a few over 500 customers on a new dial system in operation since April 1958.

"The small tornado dipped down into the town and left behind, due to wind and falling trees, etc., poles down, cables broken and drops knocked down to such an extent that over ½ of the customers were out of service.

"Now, Mr. Thorne is just about his whole plant department and setting four new poles, making seven cable splices and replacing 200 drops looked like an endless job to him. But, he wanted to get his people back in service just as quickly as he could.

"Mr. Freeman told the group of Mr. Thorne's plight. By using their

Grand River Mutual vehicles and men at LaBelle, Mo., following recent tornado: (L. to R.) I. R. THOMAS and RICHARD BYERS, cable splicers; DEAN STRATTON, lineman; GUY THORNE, owner of LaBelle Telephone Co.; JERRY NOLAND, lineman; L. E. THOMAS, construction foreman; CHARLES MORELAND, lineman; JIM DRURY, lineman; H. L. THOMAS, plant superintendent; C. W. CHASTAIN, general manager.

BUDELMAN bec

2000 MC MICROWAVE RADIO TERMINALS

New, low-cost microwave equipment for the 2 KMC band, Budelman type 14/CW, employs MONO-BLOC head-ends and final amplifiers for better stability and insurance against early obsolescence.

- 30 voice channel capacity
- 5 watts output
- 0.0005% frequency stability
- ± 200-KC FM
- wide-band (0.3-150 KC)
- low initial and maintenance costs

Write for Bulletin 1260

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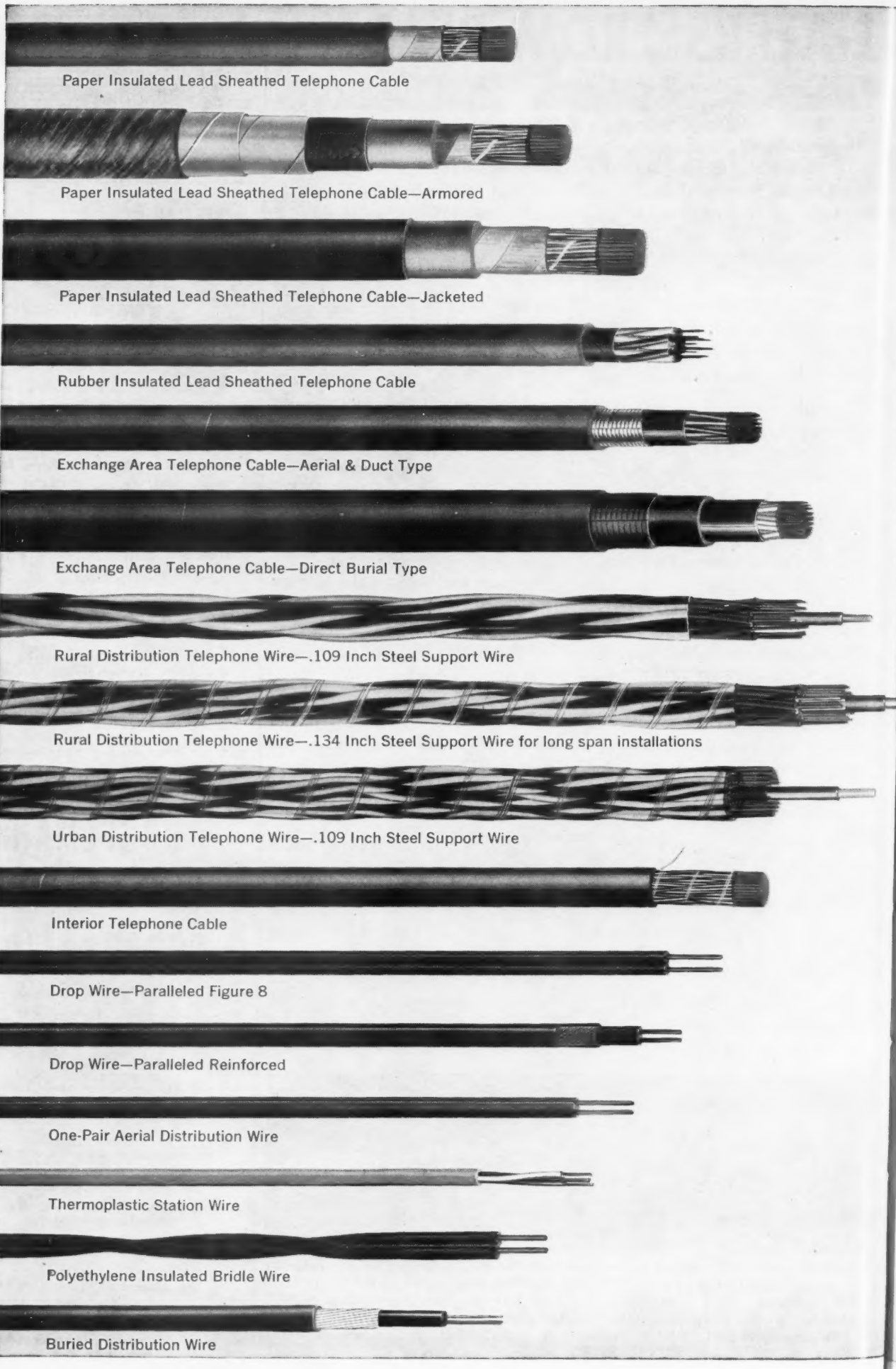


Paper Insulated Lead Sheathed Telephone Cable

Paper Insulated Lead Sheathed Telephone Cable—Armored

Paper Insulated Lead Sheathed Telephone Cable—Jacketed

Rubber Insulated Lead Sheathed Telephone Cable

Exchange Area Telephone Cable—Aerial & Duct Type

Exchange Area Telephone Cable—Direct Burial Type

Rural Distribution Telephone Wire—.109 Inch Steel Support Wire

Rural Distribution Telephone Wire—.134 Inch Steel Support Wire for long span installations

Urban Distribution Telephone Wire—.109 Inch Steel Support Wire

Interior Telephone Cable

Drop Wire—Paralleled Figure 8

Drop Wire—Paralleled Reinforced

One-Pair Aerial Distribution Wire

Thermoplastic Station Wire

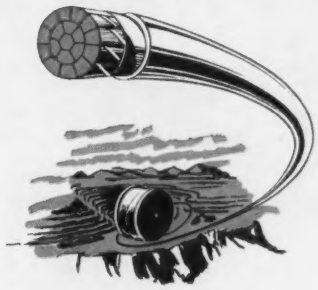
Polyethylene Insulated Bridle Wire

Buried Distribution Wire

FOR PRODUCT DEPENDABILITY . . . SPECIFY

PHELPS DODGE

TELEPHONE WIRE & CABLE



. . . the "mine-to-market" quality line!

Behind the rugged dependability and high quality of Phelps Dodge telephone wire and cable are years of experience and research in the design and manufacture of communication cables.

Phelps Dodge pioneered the use of lead, paper, rubber and thermoplastics as applied to wire and cable. This valuable background of knowledge is combined by Phelps Dodge with highest grade materials and controlled craftsmanship in fabrication. The result is a complete line of reliable telephone wire and cable that helps reduce maintenance costs and provide longer in-life service.

Phelps Dodge will be glad to help you fill your wire and cable requirements. Get in touch with your nearest Phelps Dodge sales office.

PHELPS DODGE COPPER PRODUCTS CORPORATION

PD

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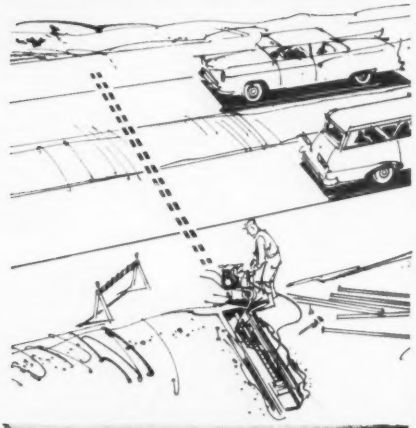
EASY, LOW-COST WAY TO RUN PIPE UNDER STREETS AND WALKS



Greenlee Hydraulic Pipe Pusher

Traffic proceeds as usual when your piping for underground cable crosses under the street this simple timesaving way. Model No. 790 shown pushes ¾" - 4" pipe about two feet per minute with power pump. A small ditch in the parkway accommodates the pipe pusher — streets and walks remain undisturbed, total job time is cut to a fraction. Ask your supplier for details or write for free literature.

OTHER GREENLEE TIMESAVING TOOLS FOR TELEPHONE WORK: UTILITY CHISELS, POWER BITS, BRACE BITS, BELL HANGERS' DRILLS, ANGLE SCREW DRIVERS

GREENLEE TOOL CO.
1778 Columbia Avenue
Rockford, Illinois

GREENLEE

recently installed radiotelephones, Grand River was able to send, by noon, two cable splicers, a heavy construction crew and two other linemen to help. With their assistance and the help of 2 linemen furnished by Mark Twain Rural Telephone Co., Mr. Thorne had all of his customers back in service by 3 P.M. on May 19.

"In expressing his gratitude, Mr. Thorne said, 'There is only one of me, but if you ever have troubles like this, I'll come to help and stay 'til it's all over.' He was very complimentary about the workers who had worked as long as it was light enough from the time they arrived. . . ."

C. W. Chastain,
General Manager,
Grand River Mutual Tel. Corp.,
Princeton, Mo.

"Especially Useful"

TO THE EDITOR: — "We have received an enquiry from a local customer, the Royal Canadian Corps of Signals, Canadian Army, asking if copies of the Plant Man's 'Spec' Book can be obtained for general distribution to their personnel. They are interested, particularly, in the series on Gas Pressurization equipment and Cable Pressurization Procedures, which have been appearing in the magazine since last summer.

"The R.C.C.S. are carrying out an extensive cable plant pressurization using Puregas equipment, and as some of the Plant Man's 'Specs' are based on this equipment, the Army feels that these 'Specs' would be especially useful to them.

"We would appreciate your advising us whether these can be obtained and the approximate price."

Thomas Joyce,
Automatic Electric Sales, Ltd.,
Ottawa Electric Bldg.,
56 *Sparks St.,*
Ottawa 4, *Ontario.*

Sorry we do not have reprints. Will two sets of tear sheets help? — Editor

To Promote A Protest

TO THE EDITOR: — "We are pleased to use your generous editorial policy and attach four copies of our bulletin board posting of the Kentucky General News carrying the editorial cartoon from page 33, May 1 issue of TE&M. There were 174 of these used to promote the protest of the 10% Excise Tax."

Robert F. Howerton,
General Telephone Co. of Kentucky,
2001 *Harrodsburg Rd.,*
Lexington, Ky.

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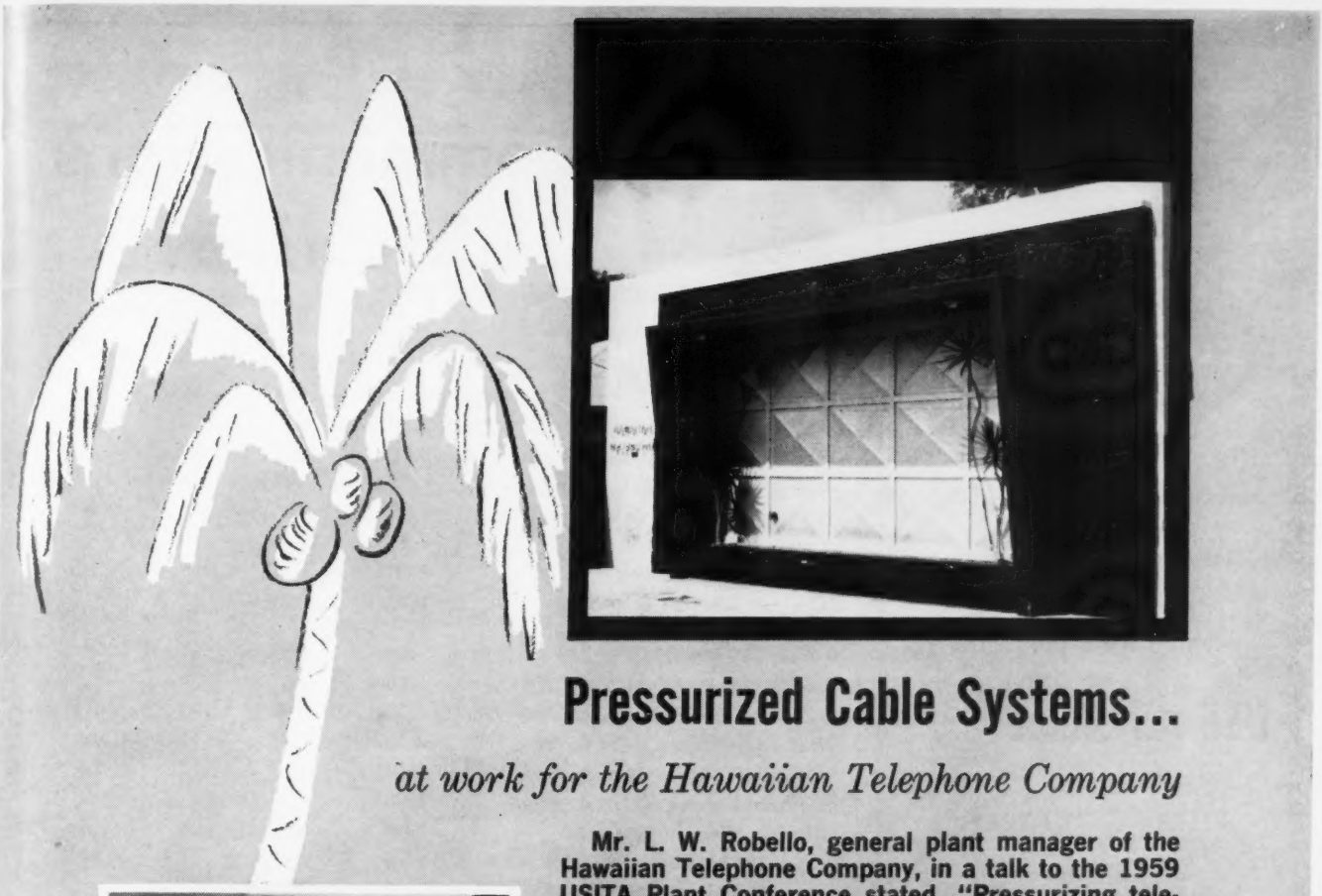


Pressurized Cable Systems...

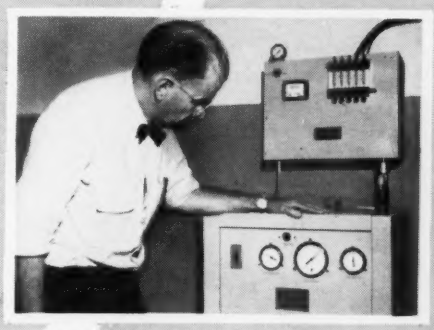
at work for the Hawaiian Telephone Company

Mr. L. W. Robello, general plant manager of the Hawaiian Telephone Company, in a talk to the 1959 USITA Plant Conference stated, "Pressurizing telephone cable plant is very worthwhile—not only in reducing maintenance costs, but what is equally important—maintaining uninterrupted telephone service to subscribers."

Serving about 200,000 stations throughout the five major Hawaiian Islands, the company has installed or ordered 47 Puregas Air Dryers to date. Their experience with these installations has proven that cable pressurization has reduced their service affecting troubles by 65%.

The Puregas continuous Feed Pressure System of Cable Protection has been the solution for this company in their efforts to maintain uninterrupted service even through their occasional heavy tropical rainstorms.

To find out how a PUREGAS Pressurizing Program can just about eliminate emergencies caused by sheath breaks and moisture damage—check-off the bulletins you would like, and send this page to us with your name and address.



Typical Model 1500 Puregas Installation in a Hawaiian Telephone Exchange

- ☐ Cable Pressurization Methods by L. W. Robello
- ☐ Data Sheets on Model 750, 1500 and 5000 Air Dryers
- ☐ "Why Cables Should be Pressurized"
- ☐ "Meter Panel for Continuous Feed Pressure Systems"

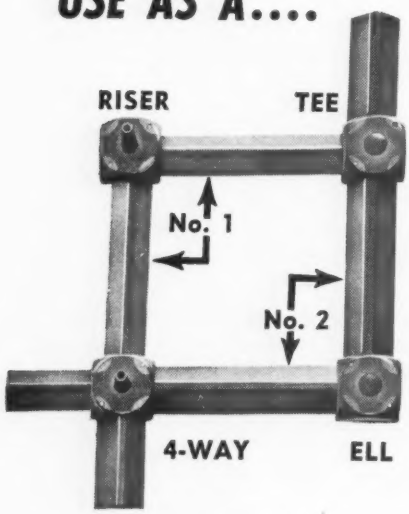
PUREGAS EQUIPMENT CORP.

578 OAK STREET, COPIAGUE, L.I., NEW YORK

PEC

NEW, universal fitting* used with the two sizes of Flexiduct solves all over-the-floor wiring problems.

USE AS A....



- **Under Floor Input**
- **Terminal Box**
- **Junction Box**
- **Or In Combinations of All**

Fits any over-the-floor wire molding. This new fitting used with Flexiducts two sizes is the popular, easy solution on all jobs.

Flexiduct No. 1
will carry up to 8 conductors of inside wire. Chase ¾" x ½"

Flexiduct No. 2
will carry up to 25 pair cloth cable or 16 pair plastic. Chase ½" x ¾"

Always keep Flexiduct on hand.

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Kellogg Switchboard & Equipment Co
Buckeye Telephone & Supply Co.

WINDERS & GEIST, INC.
2219 North Cotner Blvd.
Lincoln 5, Nebraska

"Off The Board"

Communications Securities

Markets as of June 28th, 1960	DIVI-DEND	BID	ASKED	LAST SALE
American Tel. & Tel.	3.30			89⅜
Anglo-Canadian Tel. (Brit. Col., Dom. Rep.)	1.20	38½	40½	
Bell Tel. of Canada	2.20			45⅛
British Columbia Tel. Co.	2.20	44½	46½	
Calif. Interstate Tel. (Calif., Nev.)	.70	13⅛	14⅛	
Calif. Pac. Util. (Calif., Nev., Ore.)	.90	20¼	21¾	
Calif. Water & Tel.	1.36	28½	30	
Carolina Tel. & Tel.	1.60	38½	40½	
Central Electric & Gas Co.	1.20	25½	27	
Central Telephone (Minn., Iowa, N. C.)	.88	21½	23	
Chenango & Unadilla Tel. (N. Y.)	1.20	26	29	
Cincinnati & Suburban Tel.	4.50	90	95	
Citizens Utilities (Calif., Pa.) "A"	stk. only	16¼	17¼	
Citizens Utilities (Calif., Pa.) "B"	.48	16	17	
Commonwealth Tel. Co. (Pa.)	1.00	20½	22	
Florida Telephone Corp.	1.00	27	29	
General Telephone & Electronics	.76			30¾
Hawaiian Telephone Co.	1.00	21	22½	
Indiana Telephone Corp.	.50	23	26	
Inter-County Tel. & Tel. (Fla.)	.72+stk	27½	30	
Inter-Mountain Tel. (Va., Tenn.)	.80	15½	16	
Jamestown Tel. Corp. (N. Y.)	5.60	80	—	
LaCrosse Telephone Corp.	.80	15½	16½	
Lincoln Tel. & Tel. Co. (Nebr.)	2.60	64	—	
Lorain Tel. Co. (Ohio)	1.40	32½	—	
Middle States Tel. Co. (Ill.)	.80	20	22	
Mountain States Tel. & Tel. (Ariz., Colo., Mont., Tex.)	*			195
New England Tel. & Tel. Co.	1.72			34¼
North Carolina Tel. Co.	none	1	1¼	
Northern Ohio Tel. Co.	2.00	54	58	
Pacific Tel. & Tel. Co.	1.14			27⅝
Peoples Tel. Corp. (Pa.)	4.00	92	—	
Pioneer Tel. Co. (Minn.)	1.00+stk	35	38	
Rochester Tel. Corp. (N. Y.)	1.00			24¼
Southeastern Tel. Co. (Fla.)	1.00	21¼	23¼	
Southern New England Tel. Co.	2.20	44½	46½	
Southern Nevada Tel. Co.	1.00	24	26	
Southwestern States Tel. Co. (La., Ark., Okla., Tex.)	1.20	23¾	25¼	
Telephone Serv. Co. of Ohio "A"	*	28	31	
Telephone Serv. Co. of Ohio "B"	*	28	31	
Tidewater Telephone Co. (Va.)	1.40	25	—	
Virginia Tel. & Tel. Co.	1.00	20	22	
United Utilities, Inc.	1.40	40	42½	
West Coast Tel. (Wash., Ore., Calif.)	1.28	25¼	27¼	
Western Union Telegraph Co.	1.40			46
Western Utilities Corp.	.36	7⅝	8⅜	
Western Light & Tel. Co., Inc. (Mo., Kans., Iowa)	2.00	44½	46½	

* Dividend rate on new stock after split not established

(Source of market — DEAN WITTER & CO.)

INDUSTRY NEWSLETTER

Electronic C. O. at Morris, Ill. Now Operates Four Hours Per Day

As part of electronic central office (ECO) experiment being conducted by Bell System at Morris, Ill., the ECO has been placed in service for four hours a day, it was reported last month. This part-time operation of the equipment is to continue for several months to enable engineers to complete tests and observe operation of the office in actual use.

A special telephone instrument, with its own number and separate line, has been installed in the homes of some 30 Morris telephone customers, who were selected several months ago, on a scientific sampling basis, to participate in the three-year ECO trial.

Regular 24-hour-a-day telephone service for these customers will continue to be provided by their present telephones. During the four-hour period when the ECO equipment is in operation, they will be able to use it to make and receive both local and long distance calls. The tests are being conducted by Bell Telephone Laboratories, which designed the equipment, and the Western Electric Co., which manufactured and installed it.

Illinois Bell Begins All-Numbers Switch

Samples of things ahead in the telephone numbering system appeared in Illinois Bell's telephone directories last month. About 20 out of the million numbers in the book are in numbers only. No exchange names or letters. Just three numbers, then a hyphen, and then four more numbers. The new exchange numbers match exactly the letters now used in dialing the number.

It will be many years before the new All-Number Calling system is in operation in all the 422 communities Illinois Bell serves, H. B. Stair, vice-president of operations, explained. "Many won't even start the process for a year or two. Public convenience will govern our pace.

"All-Number Calling is the solution to the problem created by the population explosion," Stair said. "It will increase the maximum of exchange prefixes from 540 (using names) to 800. That's probably enough to take us into the 21st century."

North Carolina Court Rules Out Free Phones For Cities

In upholding an action of the *North Carolina State Utilities Commission* in ordering *Carolina Telephone & Telegraph Co.* to cease the practice of giving municipalities phone service free of charge or at reduced rates, the State Supreme Court held an act of the 1959 state legislature to be unconstitutional.

The high state court reversed a decision by Superior Court Judge Walter J. Bone. Directly involved in the case were the cities of Rocky Mount and Wilson, which appealed to the court after the commission issued its order to end the practice.

The law held unconstitutional by the high tribunal sought to validate by legislative action agreements through which the telephone company provided the free or reduced rate telephone service to the municipalities.

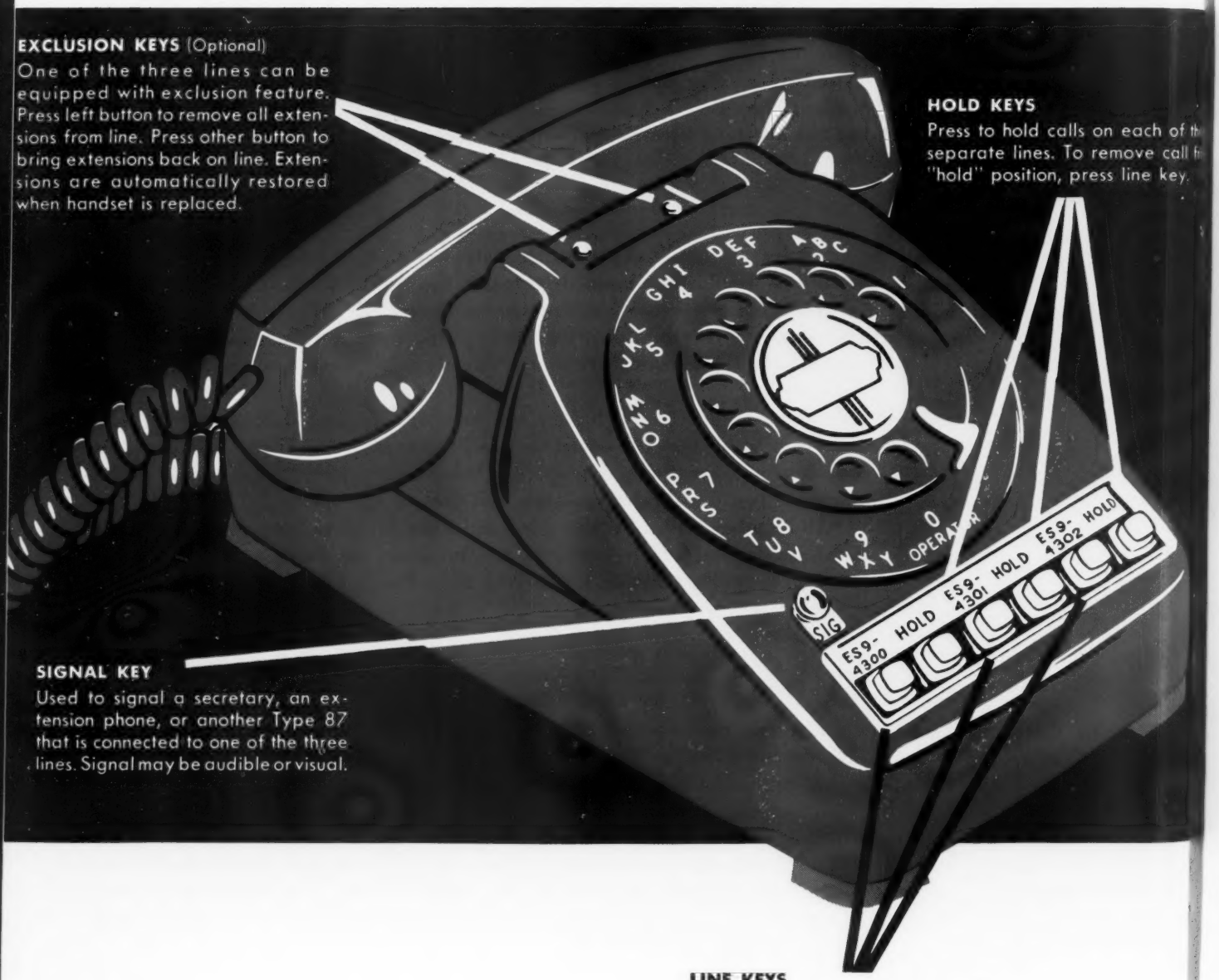
The high court held that rendering service to the cities free or at a reduced rate was discriminatory. "A fundamental basis for the regulation of public utilities," it said, "is to assure that, once monopoly powers have

NOW YOU CAN OFFE
MULTI-LIN

New Type 87 Telephone. 3

EXCLUSION KEYS (Optional)
One of the three lines can be equipped with exclusion feature. Press left button to remove all extensions from line. Press other button to bring extensions back on line. Extensions are automatically restored when handset is replaced.

HOLD KEYS
Press to hold calls on each of th separate lines. To remove call fr "hold" position, press line key.



SIGNAL KEY
Used to signal a secretary, an extension phone, or another Type 87 that is connected to one of the three lines. Signal may be audible or visual.

LINE KEYS
Press to select line or answer incoming call. Lights in keys flash on incoming calls.

USINESS SUBSCRIBERS
ERVICE AT LOWER COST

3-line phone for small offices

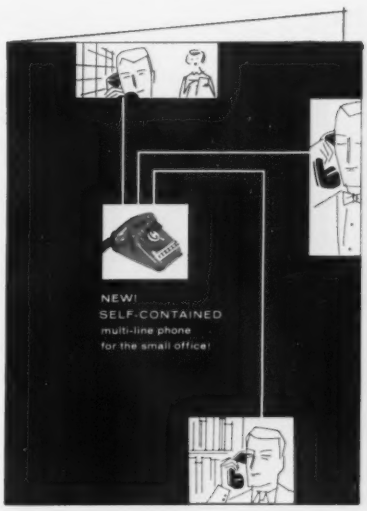
Type 87 is a multi-line phone—with an important advantage. Now—with Type 87—you can offer small business subscribers the economy and efficiency of multi-line service at *lower cost.*

Why is Type 87 lower in cost? Because it's completely self-contained. All control equipment is *inside* the phone. And Type 87 is modern-looking, too. It has the streamlined beauty of our Type 80. Naturally, your prospects can choose from 10 decorator colors.

Who are your prospects? Any subscriber who needs less than 10 phones with a maximum of three outside lines. The list is almost endless—auto dealers, doctors, lawyers, retail stores, jobbers, etc. Even large firms with PBX switchboards will find the Type 87 a valuable supplement within departments.

Look at the opposite page. See how easy—pushbutton easy—the Type 87 operates. And keep in mind that it's adaptable to many different needs.

You can sum up new Type 87 telephone in four words: *more revenue for you!*



SEND FOR DESCRIPTIVE CIRCULAR

For detailed information on the new Type 87 phone, ask for Circular 1934. Write: *Automatic Electric Sales Corporation, Northlake, Illinois. Or, call Fillmore 5-7111. In Canada, Automatic Electric Sales (Canada) Ltd., Toronto 16.*

AUTOMATIC ELECTRIC GENERAL SYSTEM

Subsidiary of

GENERAL TELEPHONE & ELECTRONICS

INDUSTRY NEWSLETTER

(Concluded from page 17)

been granted, the utility will provide all of its customers similarly situated with services on a reasonably equal basis. The public interest is paramount over any contract the city may have for a lower rate."

The tribunal agreed with the commission that the agreements calling for free or reduced rates in return for use of city streets amounted to a tax. Such a tax, the court said, is illegal. It further said that the validating act was unconstitutional because it violated the due process clause of the constitution, was not a uniform tax, and attempted to surrender the police power of the state.

Senate Committee To Explore Utility Group More Fully

The Senate Appropriations Committee plans to "explore more fully" the work of the General Services Administration Transportation & Public Utilities Service "between now and the next budget period," the Senate group declared in its report on the fiscal 1961 independent offices funds bill.

In agreeing with the House-approved figure of $2,375,000 for the TPUS, $25,000 below President Eisenhower's budget estimate, the Senate committee said it "has noted with concern the constant increase in budget requests of the transportation and public utilities services of (GSA). This increased budget, along with allegations that this work duplicates that of the regulatory agencies, concerns the committee. Accordingly, the committee looks to (GSA) to carefully reappraise this function, and the committee will plan to explore the matter more fully between now and the next budget period."

FCC Spokesmen Oppose Establishing Cabinet Dept. Of Consumers

Spokesmen for federal regulatory commissions, testifying before a Senate Government Operations subcommittee on proposed legislation to establish a Cabinet Department of Consumers, declared that while establishing such an agency is a matter of legislative policy for Congress to decide, the bill as drawn would impede their functions. Witnesses who appeared before the Senate group and expressed such views included Bernard Strassburg, assistant chief of the FCC Common Carrier Bureau.

Strassburg, as the designated representative of the Commission, said that the duties and powers of the proposed department would "in large measure duplicate the statutory powers of this Commission, and as a consequence may hamper or defeat effectuation" of the objectives of the legislation.

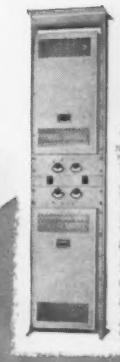
The legislation provides that the proposed department would receive consumer complaints, he pointed out, while under section 208 of the Communications Act the FCC "is charged with the duty to investigate complaints made against common carriers regarding the propriety of their interstate rates and services."

The department also would "conduct surveys and investigations into the levels of prices for goods and services affecting consumers," he brought out, and "It would therefore appear that the department would have authority to conduct investigations regarding the reasonableness of the charges for interstate and foreign service of communications common carriers and thereby duplicate the rate regulatory functions of this Commission."

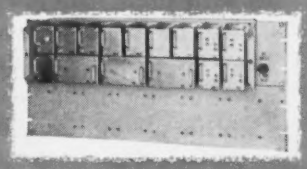
Another illustration of "duality of responsibility," the FCC official brought out, is that the department could require any company whose assets exceed $5,000,000 to file annual and special reports.

LORAIN milestones

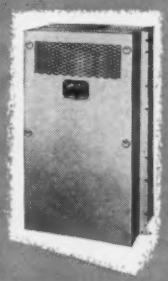
The history of Lorain Products Corporation is an unbroken series of Milestones in the telephone industry.



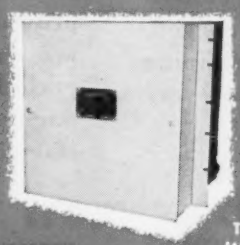
DUAL FLOTROL



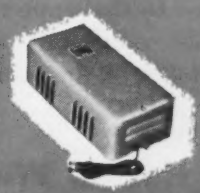
STATIC INTERRUPTER



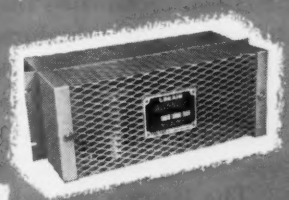
DECIMONIC CONVERTER



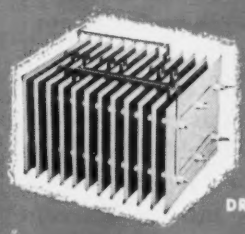
TRANSISTORIZED MULTI-FREQUENCY CONVERTER



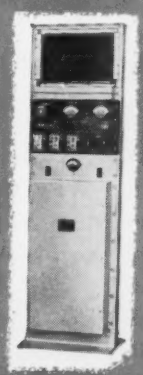
PBX POWER SUPPLY



BAT-TAP D-C VOLTAGE REDUCER



DRY CEMF CELL



POWER PANEL

PIONEERS

Not By Accident—
By Intent—
Time and Time Again

LORAIN *Products Corporation* LORAIN, OHIO

LORAIN PRODUCTS (CANADA) LTD.—ST. THOMAS, ONTARIO

DESIGNERS AND MANUFACTURERS

FLOTROL® RECTIFIERS

SUB-CYCLE® CONVERTERS

PARTNERS IN DEPENDABILITY

INDUSTRY OBSERVATIONS

By L. A. GRITTEN

"The Old Order Changeth"

FORTY years ago: A troop of horsemen gallops along a country road. The leader pays out an insulated wire from a drum. The others pick it up with their "shepherd's crooks" and toss it to safety, on hedges, fences or branches of trees. They lay a mile of wire, and have a Morse message buzzing through it, in less than ten minutes, a military communications triumph.

Today: The U. S. Army Signal Research and Development Laboratory at Fort Monmouth, N. J. lays a military coaxial cable, polyethylene jacketed, by helicopter. They lay ten miles of it in six minutes, accurately strung, suspended in trees to cross roads and rivers.

Tomorrow? Your guess — but you had better think about helicopters for your own purposes. Recently, Bell Telephone Company of Pennsylvania set 32 poles by helicopter, in a rugged, almost inaccessible mountain area, dropping them into their holes at the rate of one every five minutes.

Betty Hutton Winks

WE ATE grapenuts for breakfast — because Betty Hutton winked at us. The huge poster had one of the lady's beautiful eyes optically augmented, so that as we walked along she changed from a merry open-eyed smile to a naughty closed-eye come-hither wink. It is an effective advertisement; more so because, unlike the radio and television blurbs, it is not forced on you. You can take it or leave it — but its inherent cleverness compels you to take it and like it.

Regulatory Lag

SENATOR Magnuson (D-Wash.) calls on Congress to compel faster action by the Federal regulatory agencies. He describes them as "bogged down in red tape." Every telephone manager will echo a fervent hope that the idea may spread to the state legislatures.

Let us admit that the regulatory commissions have a difficult job; and in many cases the blame for long delays between filing and approval of telephone rate revisions lies partly with the companies themselves. If an operating company fails to present its case in the prescribed form, in tune with established procedures, it may expect to wait for its relief.

Then there may be justifiable disagreements, making it the Commission's clear duty to ensure, regardless of delay, that the filed rates are fair and proper.

However, at the best, with everything well justified and properly presented, there is too much delay. At the worst, there are too many cases where the operating company is subjected to unconscionable delay, expense and public embarrassment, created by the tactics of political appointees working for the next election and lawyers making the most of their professional opportunities, aggravated by red tape and incompetence.

An operating company may not anticipate the future by filing before its need is currently demonstrable. Retroactive decisions and interim adjustments are normally taboo. So the company loses the difference during those weary months of politico-legal bickering.

It is unlikely, but at least we may hope that Senator Magnuson's protest will result in adequate methods of compensation for the regulatory lag. One Canadian province, we are informed, does permit a "lag compensation." That is, in addition to the rate revisions that are approved, temporary surcharges are granted. They are so framed that, by the end of the stated period, the company will have received approximately as much as if the new rates had been made effective when filed.

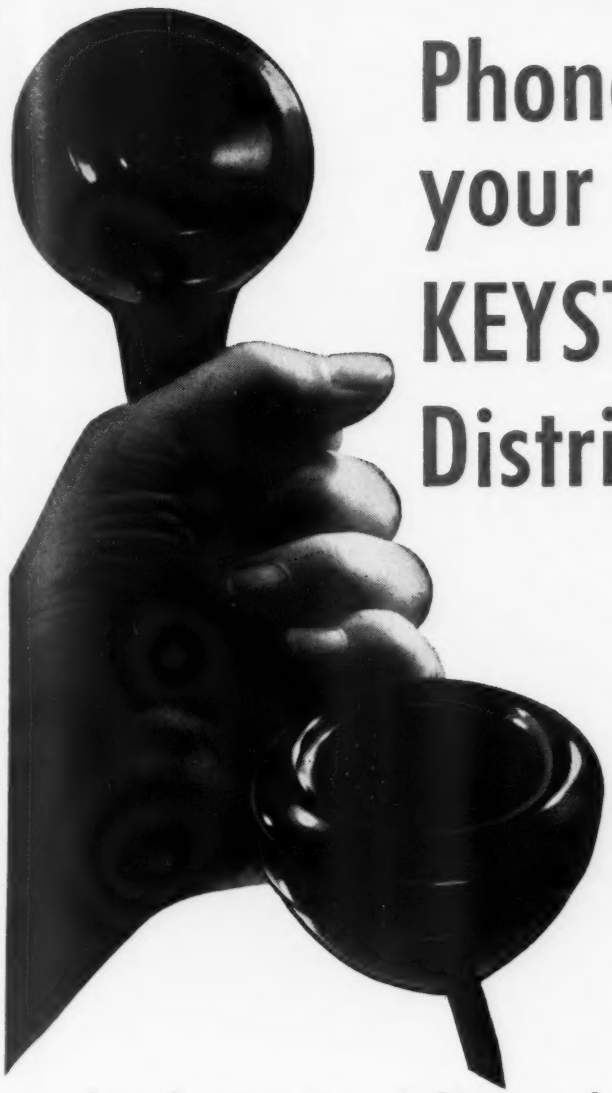
Too Much Talk?

THE Postmaster General of the United Kingdom, who runs the British telephone system, bewails their "deplorably low calling rate." He says: "It costs us capital of about £110 ($308) to provide a telephone for the residential subscriber. He then uses it on average to make about one call a day."

The British annual average, 77 telephone conversations per person, 530 per telephone, is far down in the list. In the U.S.A. in 1958 there were 472 calls per person, 1240 per telephone. However, Britain is doing very well commercially; and it is interesting that West Germany, with its splendid record of recovery from postwar ruin, is similar to Britain in some essential statistics — and talks even less!

Adenauer's Germany has 54,373,000 people, 558 to the square mile; Britain has 51,681,000, or 548 to the square mile. West Germans make only 69.5 telephone calls per person.

Can this signify that here in the U.S.A. we talk



Phone your KEYSTONE Distributor

British Ropes Canadian Fact., Ltd.
Vancouver, B. C., Canada

Crescent Electric Supply Company
Burlington, Iowa
Dubuque, Iowa
Cedar Rapids, Iowa
Davenport, Iowa
Madison, Wisconsin
Mason City, Iowa
Ottumwa, Iowa
Peoria, Illinois
Quincy, Illinois
Rapid City, South Dakota
Sioux City, Iowa
Sioux Falls, South Dakota
Spencer, Iowa
Sterling, Illinois
Waterloo, Iowa

Dakota Electric Supply Co.
Fargo, North Dakota

Joslyn Mfg. and Supply Co.
Birmingham, Alabama
Chicago, Illinois
Dallas, Texas
New Orleans, Louisiana
New York, New York
No. Kansas City, Missouri
Oklahoma City, Oklahoma
Omaha, Nebraska
St. Paul, Minnesota

Kingsport Electric Co., Inc.
Kingsport, Tennessee

Line Material Industries
Milwaukee 1, Wisconsin

Marshall-Wells Canadian Companies, Ltd.
Winnipeg, Manitoba, Canada

The Mine & Smelter Supply Co.
Salt Lake City, Utah

Nelson Electric Supply Co.
Dallas, Texas
Lubbock, Texas

Jack Pruzan Co.
Seattle, Washington

Southern Electrical Corp.
Chattanooga, Tennessee

Suttle Equipment Company
Chicago, Illinois
Lawrenceville, Illinois

Tele-wire Supply Co., Inc.
Jamaica, New York

Tennessee Valley Electric Supply Co.
Nashville, Tennessee

Wheeler Lumber Bridge & Supply Co.
Norfolk, Nebraska

...for fast wire delivery from stock

When wire is needed, call your Keystone Wire Distributor. His stocks are well supplied. He can give you prompt delivery in any emergency.

Keystone Telephone Wire is available in a full range of Class A line wire in 50M, 85M, and 135M tensile strengths, and meets the specifications of A.S.T.M., A.T.&T. and is approved by R.E.A. Galvanized bond, tie and construction wire are also available at your Keystone Distributor.

A phone call will bring you fast delivery . . . contact your Keystone Distributor for your next wire need!

KEYSTONE STEEL & WIRE COMPANY, Peoria 7, Illinois

KEYSTONE
Wire for the Telephone Industry

. . . by the makers of famous Red Brand Fence

"OBSERVATIONS"

(Concluded from page 22)

too much? Perish the dreadful thought! We'll toss that one to the statisticians of comparative loquacity, if such there be.

Let's Raid The Museums

BACK to our primordial beginnings! Heliograph messages, reflected by sunlight from mirrors, are as old as the record of human warfare. The heliograph was last used by the British in the Boer War, sixty years ago. Since then, with few exceptions, it has been a museum piece.

Now Electro-Optical Systems of Pasadena, California has a $467,000 contract with Wright Air Development Division, to build special heliographs. They will be used for the transmission of coded messages from satellites, to earth and to other satellites, as a substitute for satellite radio. The first model will weigh 30 pounds and will send light-beam signals over 10,000,000 miles.

We should study smoke signals. Apparently nothing in our past seems too primitive to be transmuted into a space age miracle.

Dollars Invested Per Worker

HOW MUCH capital is invested for each employe in your company? You know the answer, no doubt, but do all your company employes know it? A writer in *Exchange* urges that large companies should "endlessly publicize . . . not just at strike time . . . how much capital it takes to create a job for a worker," to the end that every worker will realize that his job depends on shareholders who must receive a fair return for their investment.

This sounds banal and obvious — until you ask a few questions and discover how few of your own people understand that simple fact.

Exceeding Small

BELL Laboratories would seem to have approached the ultimate in miniaturization. The April *Record* describes a high frequency transistor, developed by R. E. Davis and C. A. Bittman, so small that its active region is .0018 inches long by .0015 inches wide. It occupies an area "less than the cross section of a human hair." Engraving the Lord's Prayer on the head of a pin is pick-and-shovel work compared to that.

It recalls the story of the little girl who pondered her mother's information that God makes everything. At length she asked: "Does God make elephants, Mummy?"

"Yes, dear."

"Does God make flies, Mummy?"

"Yes, dear."

Long pause for reflection. Then: "Mummy, it must be fiddlin' work, makin' flies after elephants."

Fact vs. Theory

SOCIALISM in theory makes lovely reading. We simply drool for it — so long as it happens somewhere else, at some other time, to somebody else.

By June 30, 1959, Tennessee Valley Authority represented an investment of U. S. funds totalling $1,447,482,298. Of that amount it has repaid $250,131,519, leaving a scarlet balance of $1,197,350,779. Last year, it repaid nothing at all.

T.V.A. pays no interest on its investment, no federal tax and only small sums in lieu of taxes to state and local governments. That is socialism in fact; but if a privately owned utility, threatened with that sort of competition, dares to tell its customers that sort of facts, the cost of the telling will be denied as an allowable expense by taxation and regulation officials.

Oh, well, American democracy was wonderful while it lasted! — *L. A. Gritten.*

"Charlie certainly is careful since he burned that pole last week!"

QUICK SERVICE

FROM WAREHOUSE STOCKS...

Copperweld®

LINE WIRE, STRAND, GROUND RODS, DROP WIRE, INSULATOR TIES

Legend

These National Telephone Distributors carry stocks of Copperweld Products at locations shown on map.

- (A) AUTOMATIC ELECTRIC
- (B) BUCKEYE TELEPHONE
- (G) GRAYBAR ELECTRIC
- (K) KELLOGG SWITCHBOARD
- (L) LEICH SALES
- (S) STROMBERG-CARLSON

And supplementing these stocks—

- (C) COPPERWELD WAREHOUSES

Call Your Copperweld Distributor for immediate delivery

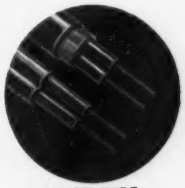
Wherever you are, the fastest, most dependable way to get Copperweld Telephone Products—the best materials for your outside plant—is to contact the Copperweld Distributor in your area. He has large warehouse stocks on hand for immediate delivery and you'll find his service convenient. Important, too, is the cooperation you'll get from his people. They're all part of a team working for you.

Place your order now with your Copperweld Distributor. He's ready to show you real service.

COPPERWELD STEEL COMPANY
WIRE AND CABLE DIVISION *Glassport, Pa.*
For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York

LINE WIRE

GUY AND MESSENGER STRAND

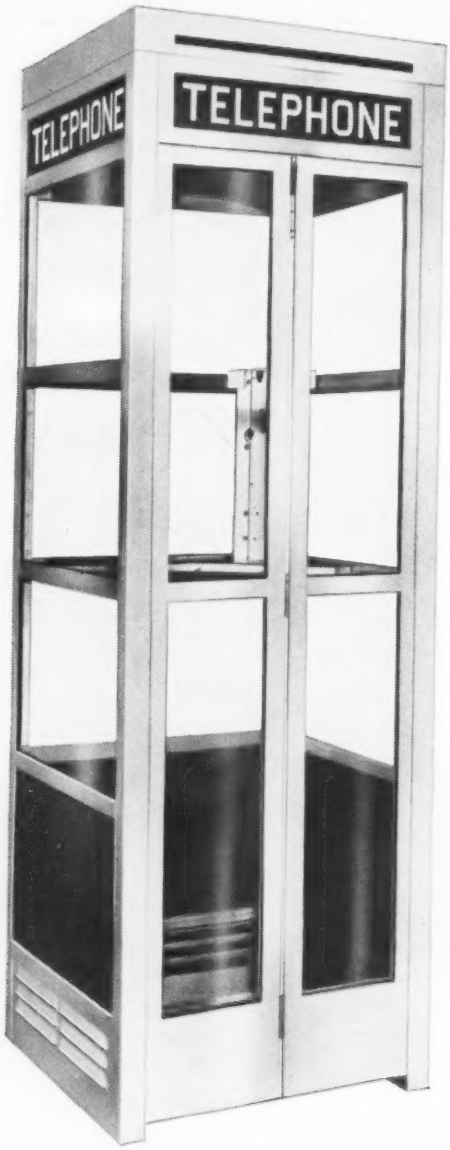

DROP WIRE

GRIP-FLEX INSULATOR TIES

GROUND RODS AND CLAMPS

NEW...Low Cost Reynolds Aluminum Phone Booths

for Indoor Installations



Compact!
Only 28¾" x 28¾" x 87" over-all dimensions!
Door opening a large 24½" x 76".

Now you can build added revenue with indoor installations of Reynolds new, lightweight telephone booths, and at a lower cost than conventional outdoor booths. The new booth only weighs approximately 350 lbs., comes fully assembled, is easy to locate and may be set up singly or in tandem. It's ideal for location in hotels, supermarkets, airports and department stores.

Made of strong, lightweight and weather-resistant aluminum, the new booths take outdoor abuse as well as indoor use in stride. Aluminum members never need painting for protection, they do not rust, warp, crack, chip or peel—are corrosion and mar-resistant—and almost vandal proof.

The Reynolds Aluminum booths are made of aluminum extrusions, clear anodized, and any combination of clear safety glass panels and ceramic fired colored panels. The doors are self closing, each section holding two clear safety glass panels. A safety aluminum tread floor is included for use in indoor installations. Optional ventilator panels are available.

Let Reynolds show you how profitable a pay station can be with low-cost, easy to install aluminum telephone booths. For the name of your nearest distributor contact the local Reynolds Sales Office, or write *Reynolds Metals Company, Box 2346-EF, Richmond 18, Virginia.* Write for Free Brochure!

REYNOLDS ALUMINUM

Watch Reynolds TV Shows: "Bourbon Street Beat" and "Adventures in Paradise"; and, resuming in October, "All Star Golf"—ABC-TV

—WASHINGTON OBSERVATIONS—

By ROLAND DAVIES and FRED HENCK

Senate Rejects Amendments To Terminate Excise Taxes

The telephone industry has good cause to wonder if the Congress and a federal administration will ever be disposed to agree to an end to the "temporary" excise taxes on communications services in the light of the latest developments in the perennial consideration of the subject.

By a 54-30 rollcall vote, the Senate rejected two amendments that had been approved by the Senate Finance Committee which would have terminated the 10% federal excise on general (local) telephone service on schedule June 30, and also would have ended the 10% excise on domestic message telegrams at the same time.

The result of final Congressional action this year on the over-all tax bill has the effect of extending for one more year the local telephone tax, to June 30, 1961. The bill passed by Congress substitutes "1961" for "1960," thus adding another 12 months to the "termination date" which had been set by Congressional action in 1959.

When the House, in passing its version of the tax bill, heard some strong and surprising support for termination of the local telephone tax, even though it was turned down, there was some belief that Senate action would ultimately lead to a Senate-House conference where agreement would be reached terminating the tax.

But on the Senate floor, after the Senate Finance Committee had taken affirmative action on terminating the telephone tax and repealing the telegraph tax, there was determined opposition from the majority and minority leaders of the Senate, as well as the Eisenhower administration.

As a result, all hopes were dashed and conference committee action was made moot as far as the communications levies were concerned.

During the Senate floor debate, Senate Majority Leader Lyndon Johnson (D., Tex) took the floor twice to urge strongly, on the grounds of "fiscal responsibility" and the heavy demands for increased defense spending, that the Treasury not lose the $463,000,000 annual revenue involved in the communications tax cutbacks.

Senate Minority Leader Everett Dirksen (R., Ill.) also lined up against the committee amendments, as did Finance Committee Chairman Harry F. Byrd (D., Va.). The Eisenhower administration position was spelled out again at the outset of the tax bill in a letter from Treasury Secretary Robert B. Anderson which contended that "It would be unfortunate indeed if premature and selective reductions in taxes were permitted to undermine the surplus in the budget for fiscal year 1961. Piecemeal tax reductions would not only prevent the attainment of the desired surplus for debt retirement in fiscal year 1961, but such reductions would also tend to postpone the achievement of the significant margin of revenues over expenditures that we should appropriately have in order to effect general improvement in the tax system."

On the Senate floor, 22 Democrats and only eight Republicans voted in favor of the communications tax repeal amendments. The only members speaking in favor of them were Senator Robert S. Kerr (D., Okla.), sponsor of the telephone tax amendment, and Senators Albert Gore (D., Tenn.), J. Allen Frear, Jr. (D., Del.), and Eugene McCarthy (D., Minn.).

Senator Kerr stressed in his speech that the telephone excise is paid by customers, rather than telephone companies, as some of the amendments' opponents had inferred. Recalling the 1959 provision to terminate the

WASHINGTON OBSERVATIONS

(Concluded from page 27)

telephone excise tax on June 30 this year, he commented that with all the talk about fiscal responsibility, there should also be "legislative responsibility."

Senator Johnson, in his closing speech, took the position that the excise has obviously not retarded the development of telephone service in the United States. Senator Dirksen, among other points, declared that repeal of the telephone tax would not aid the individual taxpayer, since New York and other states are prepared to impose it on a state or local basis.

In reporting out a bill which included provisions for terminating the telephone tax June 30 and also ending the 10% telegraph tax, the Senate Finance Committee said it approved the repeal of the general telephone service tax "both because the burden of this tax bears most heavily on those least able to pay, and because a substantial portion of this tax is a business cost item which enters into the costs of other goods and services, and therefore is a factor tending toward higher prices generally.

"The tax on domestic telegraph service is repealed in part on the grounds that this tax also is a substantial business cost item. Also, it should be recognized that these taxes, to the extent that they are not reflected in the higher prices, result in reductions in profits subject to the individual or corporate income taxes. Thus, the loss in revenue resulting from the repeal of these taxes can be expected to be offset, to some extent, by increased income tax collections."

REA Revises Telephone Loan Procedures

The Rural Electrification Administration announced revisions in the procedures for planning REA telephone loans to serve new areas, expected to result in simplified loan planning, lower over-all engineering costs, and greater participation by borrowers in the actual process of planning and constructing their telephone systems.

The changes, which became effective July 1, include combining the formerly separate area coverage survey and design reports previously required into a single "basic system plan" report. Presentation of data and cost estimates in the new basic system plan report also has been simplified.

Other changes include eliminating the requirement that standard toll and operator office agreements be submitted, other than identifying them, and with more detail to be asked only in unusual cases; ending the rule that borrower's counsel had to search records for liens, if the last previous search was made within two years; reducing the amount of material required on outside plant bids; and cutting down on data to be furnished on scheduling of construction activities and final inventories of plant.

FCC Commissioner Lee's Renomination Confirmed

After long delay in taking final action, culminated by debate in which it was generally contended that the qualifications of FCC Commissioner Robert E. Lee were not being questioned, but that the over-all performance of the Commission has not been good, Lee's renomination for a new seven-year term has been confirmed by the Senate by a 64-19 vote.

All members of the Senate who were recorded against the nomination were Democrats, most of them regarded as belonging to the "liberal" wing of the party.

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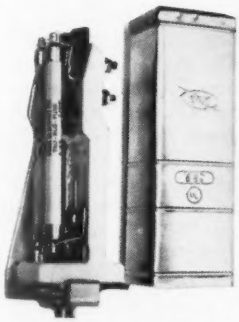

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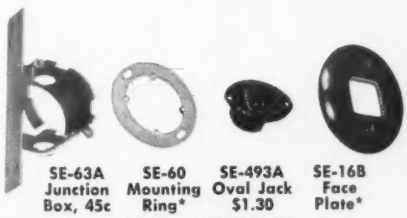

SE-63A Junction Box, 45c — SE-60 Mounting Ring* — SE-493A Oval Jack $1.30 — SE-16B Face Plate*

*SE-60 and SE-16B, 45c

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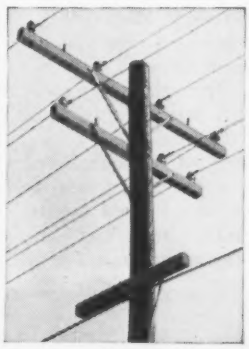

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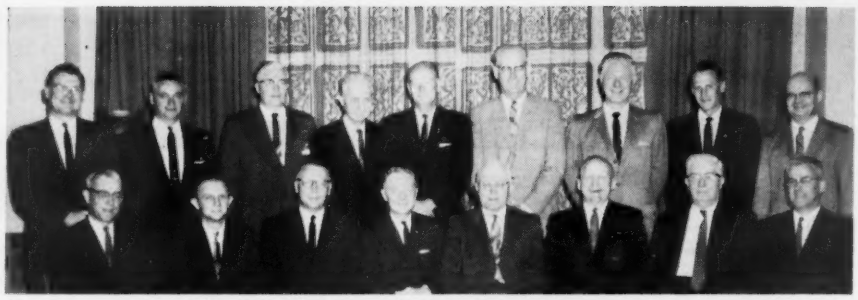
INDUSTRY VIEWS

GAY T. HENDERSON, Lincoln, Neb., was elected president of the Frank H. Woods chapter of the Independent Telephone Pioneer Association. He succeeds Miss Clara M. Jones of Lincoln. Others elected were Richard B. Hobson, vice pres.; Grace Hauschild, sec.; and Georgia Smith, treas. Lola Hetherington and B. D. Pattison were named as members of the executive committee. All are of Lincoln. In her annual report, President Jones announced a record membership of 623, including 30 auxiliary members.

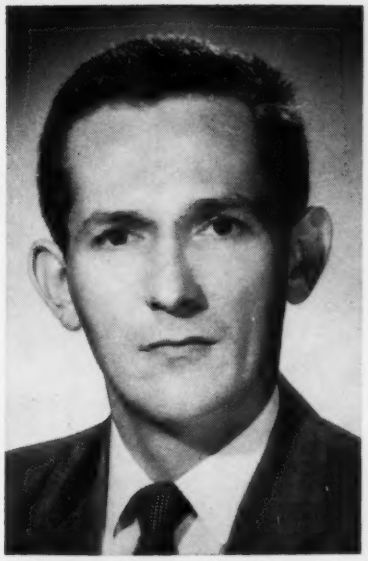
REGINALD E. KEPLER, marketing and sales manager, General Tel. Co. of Ill., Bloomington, addresses the annual convention of the Illinois Telephone Association.

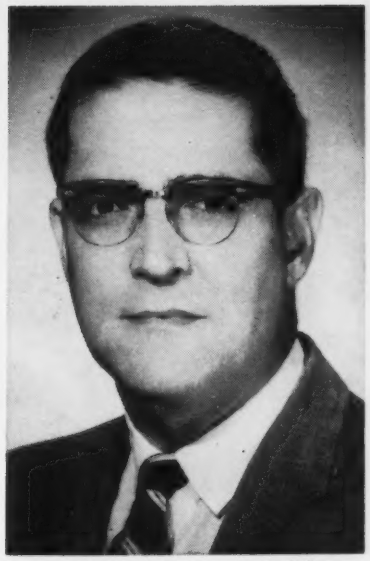


Directors of the Illinois Telephone Association and guests. Back row (l to r): ROBERT P. REUSS, vice pres. and gen. mgr., State Area, Illinois Bell Tel. Co., Springfield; ROBERT M. WOPAT, pres., General Tel. Co. of Ill., Bloomington; GRAYDON TROUT, gen. staff engineer, Illinois Bell Tel. Co., Chicago; BEN N. BOYNTON, general counsel, Springfield; M. A. KUGLER, pres., Okaw Commercial Tel. Co., Okawville; DON ANDERSON, mgr., Geneseo Tel. Co., Geneseo; A. T. RENN, Bell-Independent relations mgr., Illinois Bell Tel. Co., Chicago; JAMES STICE, gen. mgr., National Trail Tel. Corp., Altamont; RAY J. ALTER, gen. mgr., Intra State Tel. Co., Galesburg. Front row (l to r): F. S. COAKLEY, gen. mgr., Dixon Home Tel. Co., Dixon; R. W. BRITT, vice pres., General Tel. Co. of Ill., Bloomington; O. M. WESTRUP, vice pres. and secy., Illinois Consolidated Tel. Co., Mattoon; K. L. SCHROEDER, vice pres., Northwestern Tel. Co., Freeport; ROLAND SCHMIDT, pres., Home Tel. Co., St. Jacob; DANIEL SCHAEFER, gen. mgr., DeKalb-Ogle Tel. Co., Sycamore; J. G. HARDY, secy., Illinois Telephone Assoc., Springfield; RUSSELL LOGUE, vice pres., C T & N Tel. Co., Casey.

Illinois conventioners ROBERT P. REUSS (left), vice president & general manager, State Area, Illinois Bell Telephone Co., Springfield, and DONALD VORHEES, conductor, Bell Telephone Orchestra. Reuss was a featured speaker at the convention.

G. J. EDLAND (left), Bell-Independent relations representative, Illinois Bell Tel. Co., Chicago, meets with J. G. HARDY, secretary, Illinois Telephone Association, Springfield, and DON ANDERSON, manager, Geneseo Tel. Co., Geneseo, at recent Illinois convention.





DONALD A. REDMAN (left) has been named controller of the General Telephone Co. of Kentucky to succeed Leonard W. Snodgrass, who has been transferred to General Telephone Co. of Pennsylvania. BILL H. PENROD (center) and WAYNE STERLINSKE (right) have been named assistant controllers of General of Kentucky. Redman has been assistant controller of General Telephone Co. of Kentucky since 1956. He previously held various positions in the secretary treasury and accounting departments of the General Telephone Co. of Pennsylvania. Penrod joined General Telephone Co. of Kentucky in 1951, and has held various positions of responsibility in the accounting department. Sterlinske joined General Telephone in 1958 and has served in various positions in the accounting department.

Chairman LEONARD BESSMAN of the Public Service Commission, one of the Wisconsin convention speakers, posed for photographer Tom Segerson of General Telephone Co. of Wis., before an Ericson telephone which was in use in the very early part of the 20th century.

FOSTER McHENRY, USITA president, reported on National Association activities to the delegates of the Wisconsin State Telephone Association.

ROBERT M. WOPAT, left president of General Telephone Co. of Illinois, admires the company's 350,000th telephone, which was recently presented to WILLIS L. WOOD, national service manager, Admiral Corp., Bloomington, who looks on. A gold plate was placed on the instrument, commemorating the event.

Members of this Illinois Convention group are (l to r): J. G. HARDY, secretary, Illinois Telephone Association; RAY RIORDAN, secretary-treasurer, Wisconsin State Telephone Association, Madison; and L. J. NEUMEISTER, engineer, Public Service Commission of Kentucky.

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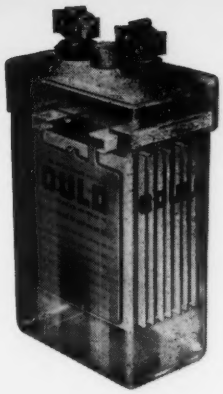

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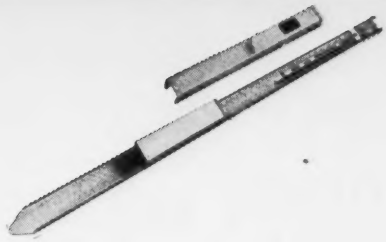

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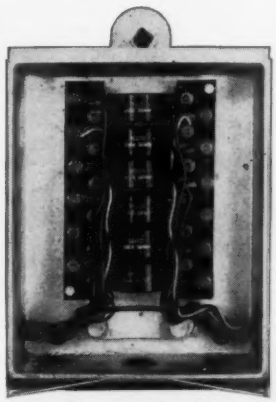
Dependable Power! Hundreds of telephone exchanges throughout the world attest to the low first cost, low operating cost, and thoroughly dependable service of Electrox Battery Eliminators and Chargers. Made by the SCHAUER MANUFACTURING CORP.



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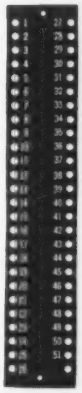

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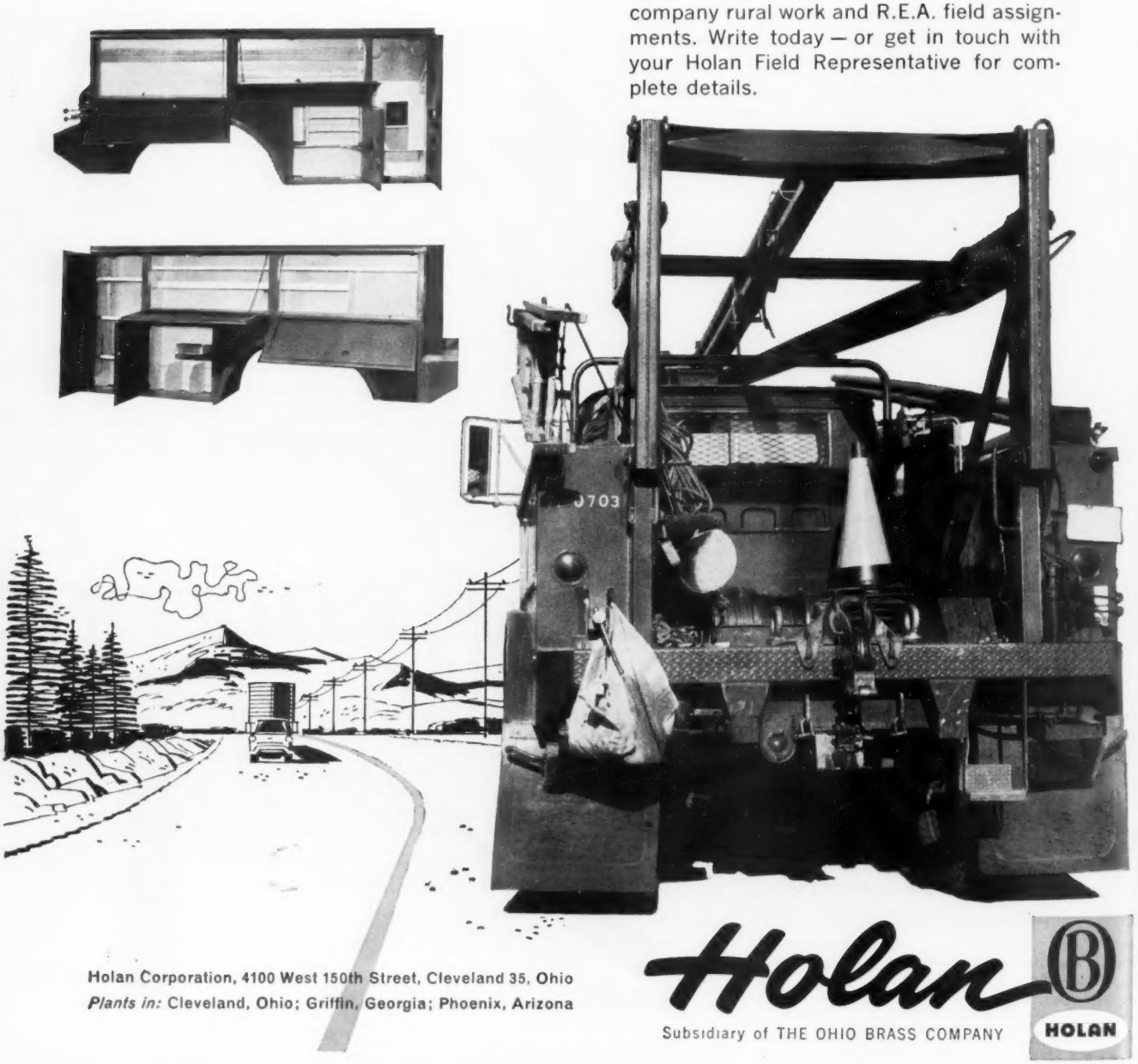

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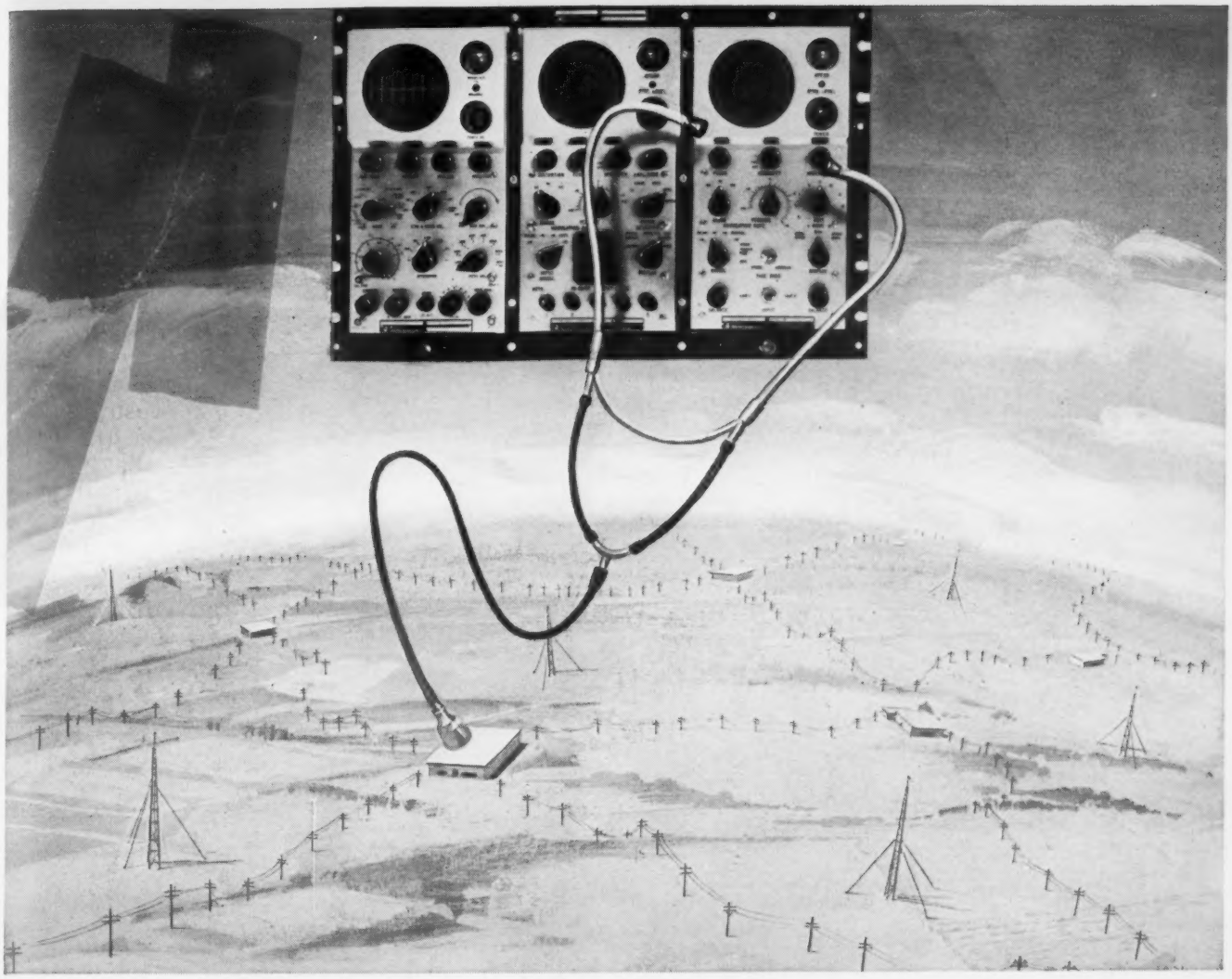

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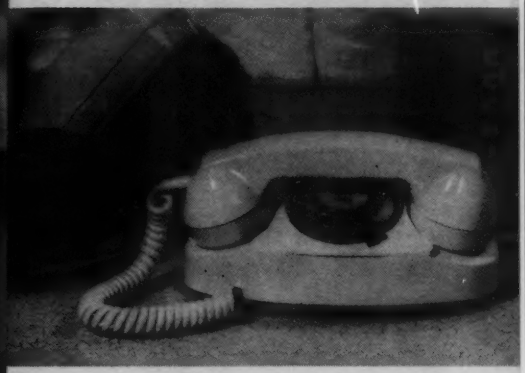

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You'd think their fate would have taught us a lesson.

Yet today we Americans spend twenty billion dollars a year for legalized gambling, while we spend a niggardly four-and-a-half billion for higher education. Think of it! Over four times as much! We also spend six-and-a-half billion dollars a year for tobacco, nine billion dollars for alcoholic beverages, and billions more on other non-essentials.

Can't we read the handwriting on the wall?

Our very survival depends on the ability of our colleges and universities to continue to turn out thinking men and women. Yet today many of these fine institutions are hard put to make ends meet. Faculty salaries, generally, are so low that qualified teachers are leaving the campus in alarming numbers for better-paying jobs elsewhere.

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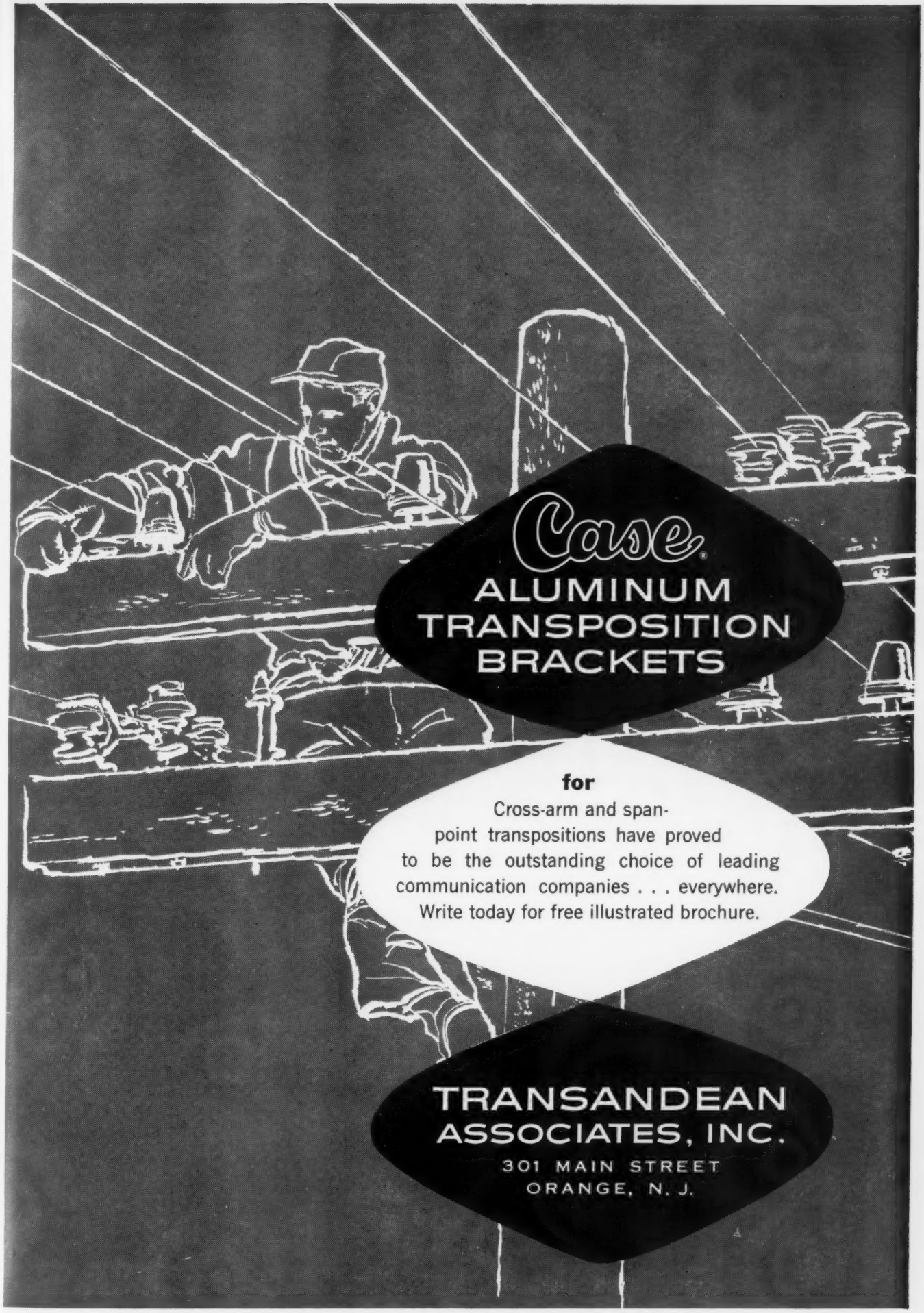
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Despite satellites, the workhorse of systems communications will still be the same old cable pairs. But with alternate routing and VNL you'll regard them in a new light; and you'll take a more searching look at load coil spacings, net loss and return loss, while bias and sigma (old words with new meanings) will force you to correct trunks that don't meet minimum standards.

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"Cents-Less Accounting"

There are more pennies to be earned today than Ben Franklin ever dreamed of, and your company can earn them by saving pennies — the ones at the ends of accounting entries.

By G. M. JONES
Associate Professor
Accounting Department
Michigan State University
East Lansing, Michigan

POOR RICHARD'S two-century old admonition that "A penny saved is a penny earned" is still good in the twentieth-century business world. There are more pennies to be earned these days than that old sage Ben Franklin ever dreamed of, and they can be earned in your telephone company by saving pennies — the ones at the ends of accounting entries. Except for those detailed accounts which, because of law or custom or third-party needs, have to be kept right to the penny, we can save dollars by doing "cents-less" accounting.

Whole-dollar accounting is not new. Back in 1927, Bethlehem Steel's comptroller and his staff began to ask each other, "Why should we put in so much time and effort in keeping track of the pennies when we're accounting for hundreds of millions of dollars? What is it costing us to carry it all out to the penny?" Their initial experiments with cents-less accounting resulted in its permanent adoption for most internal accounting records.

Subsequently, other companies devised their particular versions of whole-dollar accounting. Industries using this method of clerical work simplification range from food and soap manufacture to international air travel, department stores, and electric and gas utilities. Such businesses as Pan American Airways, Ashland Oil, Cleveland Electric Illuminating Co., F. & R. Lazarus, and Colgate-Palmolive Company are included.

Whole-Dollar Reporting vs. Whole-Dollar Accounting

THERE are a large number of companies who do not bother to show pennies in their annual reports. After all, what relevance has 63¢ when you're dealing with thousands of dollars, many of which have been arrived at by estimation or allocation? Other companies round off to the nearest hundred dollars or even the nearest thousand without impairing the real purposes of corporate reporting.

But reporting whole dollars in the financial statements is not the same as carrying the internal accounts in whole dollars. The former simplifies the preparation and reading of the public reports; the latter reduces the clerical work of making entries, postings, transfers, summaries, internal reports, and working papers. There are few economies in rounding off in making up annual reports; on the other hand the daily elimination of petty penny detail has been found by a number of controllers to reduce clerical requirements all year long, to cut down opportunity for posting and checking error, and to save space and confusion on report forms.

For those accounts which do not

require the keeping of detail, all entries are rounded to the nearest dollar at the earliest possible point in recording. Amounts ending in $.50 are rounded to the nearest even dollar. (*See Exhibit One.*) In order that the accounts may stay balanced, the odd cents are accumulated in a "Penny elimination account" which at the end of the year is closed out to Profit and Loss. The surprising thing is that, due to the uniform method of rounding, the net balance of this account is minute in comparison to the volume of transactions. For instance,

EXHIBIT ONE

Rounding Procedure For Whole-Dollar Accounting

Item	Rounded To
.39	—
.68	1
.93	1
1.44	1
1.49	1
1.75	2
2.50	2
2.77	3
3.50	4
3.81	4
19.26	19

Error: 26¢ or 1.35%

one firm's net variance ranges between $200 and $300 per year on a transactions volume of $80 to $90 million; a large power and light company shows an average net variance of less than $5 per month in the internal accounts connected with the billing process.

Typically, the accounts and entries which are susceptible to rounding of amounts include:

Stores control accounts
Payroll analysis and distribution
Expense ledgers and distribution
Plant accounts
Revenue ledgers and distributions
Estimated liabilities
Estimated expenses
Adjustments to surplus accounts
Inter-account transfers

Accounts which cannot be handled readily this way include:

Cash
Accounts receivable
Accounts payable
Customer deposits

Wage and salary accruals and employe pay records

Withholding and payroll tax liabilities

1-ACCOUNTS PAYABLE

PAYMENT VOUCHER

No. 34742
TRANS. DATE 1/5/60
DUE DATE 1/15/60
P.O. No. 738

VENDOR:
Mills Heating Company
24 W. Main Street
Homeville, PA.

AUTH. 12/22/59 WJR

	Repairs to heating system main building 1/3/60		112.64
			112.64

ACCOUNTING DISTRIBUTION

DR.		
606-02 REP TO B&G	112	
790-01 PENNY EL.		64
CR.		
159-01 VOU. PAY.	112	64

APPROVAL
INV.
P.O.
CLASS.
CONT.
TREAS.

EXHIBIT TWO: Whole dollar accounting applied to expense vouchering.

Generally, about 90% of the ledger accounts fall in the first category. Entries therein can be rounded to the dollar without impairing the managerial usefulness of accounting data and without running into subsequent reference and reconciliation problems.

While amounts transferred between internal accounts through distributions of one kind or another will lose little through rounding, it is almost essential that unit costs and rates used in making such distributions still be carried out to a normal number of decimal places. Cutting allocation rates back too far often would result in rather lumpy distributions which would over- or under-distribute allocable amounts.

Most of the companies initially started out to apply the rounding technique to individual line items on original documents, such as stores requisitions, individual time tickets, etc. Since this was found to require an individual review of each item on each document, an extra manual step, soon the principle began to be applied to batches of documents, and could then be extended to broader areas such as payroll and payables, where the total credit drawn from summary of detail documents would reflect the exact amount but the corresponding debit distribution to a series of expense accounts could be stated to the near dollar only. After punched cards were used extensively for recording transactions as they occurred, each transaction card item was punched to the penny, but reports, analyses, distributions, and summary amounts developed by machine were rounded to the dollar automatically.

Some controllers have chosen to call this method "controlled tolerance accounting" because some limits usually are specified for the total amount of penny variance allowable in a batch of documents of given size. For instance, one company handles

billings in batches of 700, which, of course, must be detailed to the penny, since they deal with outsiders. But the credits to the several revenue accounts, as they are accumulated in the billing process, are rounded to the dollar. The amount of variance between the receivable debits, in total, cannot exceed $5 for a batch. Smaller variances are posted to the penny elimination account; a variance over $5 must be investigated immediately, and if it is purely a result of randomness in rounding, it is posted to the penny elimination account. Otherwise, the error behind the excessive variance is located and corrected.

What's Good About It?

THE MOST thorough study of whole-dollar, or "cents-less," accounting was made in 1957 by Florence May and H. F. Klingman for the Controllership Foundation, and was published as *Whole-Dollar Accounting* (Controllership Foundation, Inc., 2 Park Avenue, New York 16; 1957; $7.50). The authors prepared case studies of 14 companies using whole-dollar accounting. On the basis of this empirical evidence, they generalized on the advantages, disadvantages, and limitations of whole-dollar accounting.

Among the advantages which they found are the following:

(1) There is a reduced amount of time and work required in recording transactions and posting to accounts, summarizing, copying, tabulating and analysis, and in balancing and closing the books.

(2) There is improved efficiency in the accounting operation through improving output per clerical hour, improving quality of clerical work through error reduction, and reduced clerical cost. The latter is accomplished by absorption of work load growth without adding personnel, by reduction of peaks in data handling, or by reduction in staff needed.

(3) There are fewer errors, which are much easier to locate and identify. (*See Exhibit One.*)

(4) Reports and statements can be prepared more quickly than before, because there are fewer figures to be incorporated in them.

(5) Reports are improved. They are easier to read and less crowded.

(6) Capacity of report forms is larger, since two columns and decimal point are eliminated for each category across the page. Either more data can be shown or size of report form can be trimmed. (*See Exhibit Three.*)

(7) There is improved morale after the rounding method is properly introduced and understood; it reduces frustrating hunts for balancing errors.

SUBMIT YOUR PROBLEMS

You are invited . . . to tell TE&M authors your problems of department policy or procedure on which you'd like to have an opinion.

(8) The whole idea is simple and easy to adapt to.

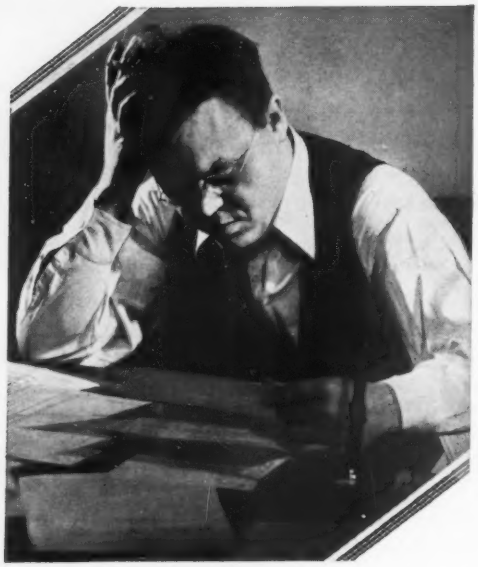
The authors found that controllers' department personnel in the companies studied were not so naive as to regard this as a panacea, but only as one form of work simplification. Other methods of office improvement — forms control, work standardization, and so on — were as desirable as ever. — *To Be Continued.*

MIDGET TELEPHONE COMPANY — ENGINE #C929016 — SER.# 3524640 — VEH.# 128

VEHICLE OPERATING RECORD — MAKE Chev. — BODY TYPE P3/4 Box — LIC. #LP2624

REF. 1959	GAS GAL.	GAS AMT.	OIL LUB. QT.	OIL LUB. AMT.	MAINT. SCHD.	MAINT. UNSCHD	TIRE BATT.	LIC. INS.	DIR. COST	DEPR.	700 ALLOC.	TOTAL COST	MILES
12/4			2										24014
6	16	4.80		.92									
11				1.55		2.							
12	14	4.20					18						
15	12	3.60	2	.92									
22	16	4.80			9								24712
Dec.		17		3	9	2	18		49	38	22	109	698
										OP/MI - Dir. .070			
											- Tot. .156		
1960 1/2	18	5.30	1	.46		2		16					
1/4					3								

EXHIBIT THREE: Vehicle operating record, cents omitted.



"TRAFFIC LIGHTS" by D. A. PERIGO

The Traffic Engineer as a Mathematician and Prophet

IN A previous article (TE&M 7-1-60) we said the Traffic Engineer "is a statistician, a mathematician, a prophet, an idealist, and a diplomat." We also made a few remarks about the statistical duties.

Now as a mathematician!

We have reached a point in civilization where a great deal of pioneering has already been done and as a result we have our probability tables. The names of Erlang, Molina, and Molnar are well known in telephone mathematics — and they have saved us hours and hours of struggle by giving us our mathematical guide posts. In effect this means that our traffic engineer today does not need to be the mathematician that was required many years ago.

Nevertheless today's traffic engineer must translate yesterday's statistics into tomorrow's switchboards and trunks. This is a fairly easy job when there are no changes in the method of operation — but in today's telephone world there are big changes taking place constantly. Let's illustrate.

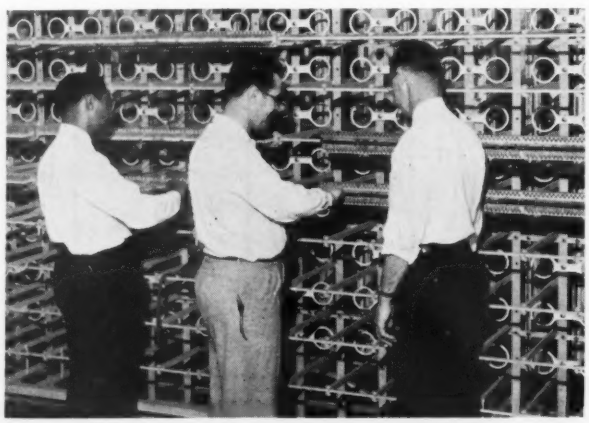
We have a local manual and toll office with ringdown toll circuits to eight other offices. Future requirements are directly related to growth trends. The subscribers are receiving a good grade of service but somebody says this is a horse and buggy system and the rabblerousers finally force us into a dial system. (Of course, there are other reasons for dial conversions — such as economics — but we thought saying it this way would provoke more thought.)

Providing The "Paths"

THE TRAFFIC engineer must first of all translate every action on the local manual switchboard into switches, links, etc., to provide the paths (highways) for those calls to get through the dial equipment. He must compute a calling rate and a holding time. He must be able to determine the "usage" which results from combining the calling rate and holding time. A change from manual to dial not only transfers the paths of the manual switchboard to paths through the dial equipment — but also transfers the *work* done by operators to the dial switches, links, relays, etc.

All of this must be done on a balanced basis — which requires mathematics. This problem can perhaps be best illustrated by one which a friend of ours encountered on the Pennsylvania Turnpike where there are several tunnels. The tunnels have only one lane in each direction but the rest of the road is two lanes.

There was no problem initially but as traffic increased — as it had when our friend took a trip — there was a definite delay in peak traffic periods. In a step by step dial office



Today's traffic engineer must translate yesterday's statistics into tomorrow's switchboards.

the provision of sufficient linefinders and connectors can be completely sabotaged by having insufficient second selectors. The traffic engineer, through the use of mathematics, makes certain this does not happen.

Now let's look at what we have done by converting the local manual to dial. We must modify the toll board for dial recording trunks so the subscribers can reach the operator, and toll switching trunks so the operator can reach the subscribers. These might be two way trunks — or one way only.

The traffic engineer, through mathematics, determines how many are required and how they should be arranged. Since we now have a dial system, probably a large part of the incoming toll traffic can be dialed direct to the subscribers. This cuts down on the number of toll switch trunks required — but wait a minute! All of our toll trunks are ringdown — and we can't dial over those. So the traffic engineer must figure out the toll switch trunks on a new base and he must also determine the effect of changing the ringdown trunks to incoming dial.

This chain of changes goes on and on. For example, a neighboring office converts to dial. There is agitation for Extended Area Service. This brings on new mathematical problems for the traffic engineer.

Other things happen such as operator toll dialing, customer toll dialing, new industry moves to town with large PBX requirements, or some other company makes changes in its methods of operation. All of these things cause the traffic engineer mathematical problems.

The changes are not limited to equipment. A change in toll coefficients, for example, causes the traffic engineer to recalculate the effect on position requirements.

Perhaps these things sound trivial to the traffic engineer who has, more or less, accepted these things as part of his job without giving too much thought to the whys and wherefores.

Unfortunately we can go down a long list of companies we know about where changes have been made "*because someone else did it*" rather than from the mathematical computation of what is right or wrong. Admittedly mathematics might lead to the same conclusion and in many cases it undoubtedly would — but you then have the assurance it is right instead of blindly following someone else's lead.

We chose to include the traffic engineer as a prophet in this same article because of the way it ties in with the mathematics.

Past, Present, Future

SO FAR we have written about changes *at the time they are made* — but the traffic engineer must also consider the effect at some future time — hence the use of the word "prophet."

Repetition, we know, bothers some people — but on the other hand it is sometimes necessary for emphasis — and when we talk about the future we must recognize our obligations — so again — *It is the function of a traffic department to move a company's products — and our products are telephone calls regardless of destination or method of handling.*

In planning the plant, preparing budgets, and financing a telephone company top management must *know* what will be required in the future to handle our traffic. The traffic engineer as a *prophet* tells management what will be needed for several years in advance. The over-all plan includes changes in methods of operation in neighboring companies as well as your own, economic changes in each community, population trends, and telephone development trends.

One illustration may serve the purpose. A study of DDD feasibility was made. This study covered a toll center and ten tributary offices. It was made on the basis of operator identification, automatic identification of one and two party services only, and a combination of these two plans. These offices have an unusual amount of Person and special traffic — but the trend is downward. The study showed that DDD was not feasible with any plan in the immediate future but in a few years the automatic identification of one and two party services begins to look attractive. There is a trend toward higher grades of service. This study, of course, involved other departments but it was the traffic engineer who through mathematics and a look into the future indicated how much and what kind of traffic must be handled.

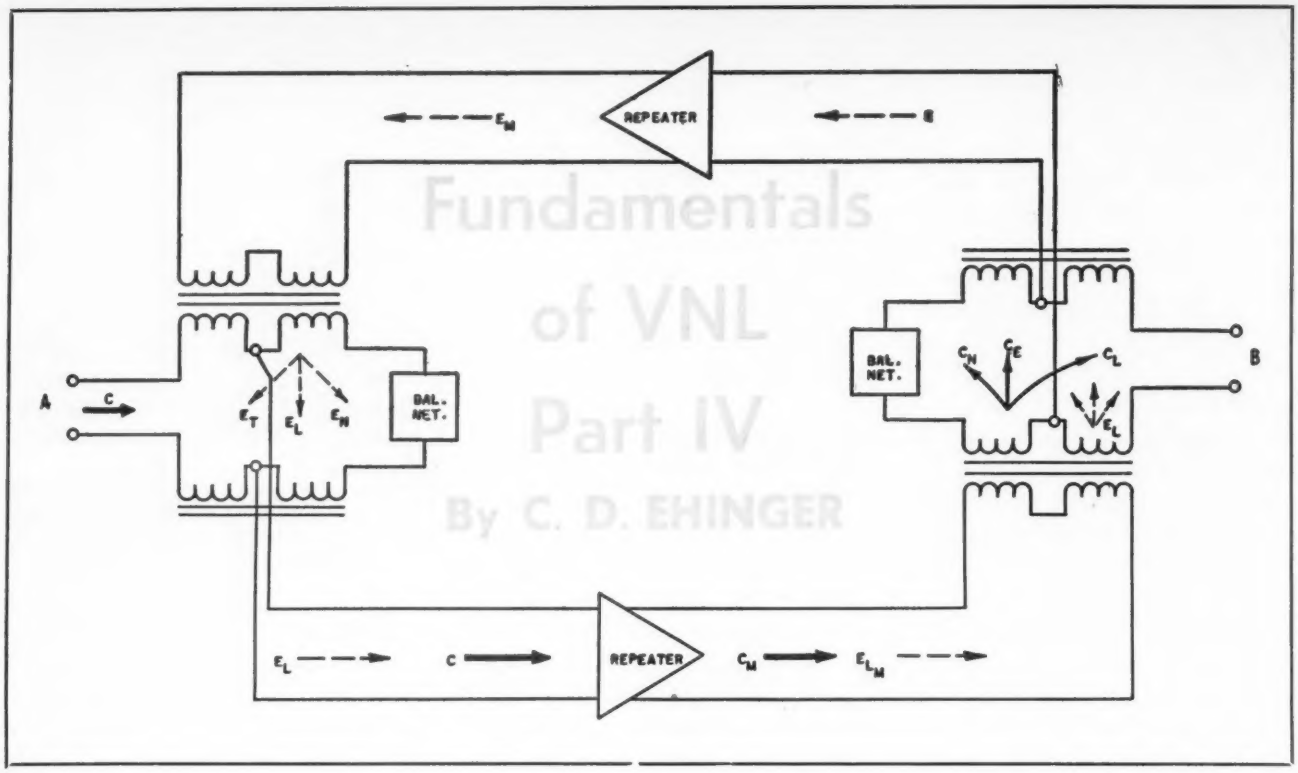
The result of the study was that management decided there should be no immediate plans for DDD — but instead money would be invested in outside plant to hasten the trend toward one and two party services. This would bring nearer the time when automatic identification would prove in. In the meantime there will be no investment in equipment with a high obsolescence factor and the laboratories and manufacturers may develop a better and more economical method of automatic identification in the tributary offices. This decision was based on the traffic engineer's *prophecy* of what the future holds.

The small company manager changes his hats from construction superintendent to maintenance supervisor, to merchandising manager, to collection agent rather quickly and frequently. We want to see him wear his traffic engineer's hat often.

Next time we will write about the traffic engineer as an idealist and a diplomat. — *D. A. Perigo.*

PROGRESS

IN THE telephone industry constantly improved tools and equipment and a skilled force have made it possible to do more work, more efficiently, in less time, with less effort. Such progress has brought many benefits, including lower rates for customers. In 1896 a New York subscriber could call Chicago, station-to-station at the day rate, for $9. He can make the same call now for $1.45, plus tax. A call to St. Louis cost $10; now it's $1.50. Not until 1915 could a caller even reach San Francisco. San Francisco can now be dialed directly for $2.25. — *Telephone Review.*



Fundamentals of VNL Part IV
By C. D. EHINGER

This article concludes Mr. Ehinger's discussion of VNL. In the preceding three articles, Mr. Ehinger discussed practical limitations on transmission levels and VNL factors and their application. In this final article, a further example of application is given and the method of calculating "Bias" and "Distribution Grade" is described.

ANOTHER example of the method of calculating circuit objectives may help to illustrate the use of VNL factors:

Example Two

Toll circuits between a toll center and a terminating office (Class 5) are to be engineered. Circuit make-up consists of a total of 2.5 miles of 19 ga. H88 cable plus 42 miles of open wire. Because of circumstances, only 30 miles of the total of 42 has carrier operating on this open wire. The circuits are to be operated as 2-wire facilities. What should be the design objective?

Answer

Since one of the offices is a terminating point (Class 5) the circuits will always be used as terminating links and should be designed for VNL + 2 db. This loss is calculated as follows: (VNL factors — from *Table One.*)

2.5 mi. × .03	.075
12 mi. × .01	.120
30 mi. × .0017	.051
Maintenance variation	.400
Termination loss	2.000
	2.646 db

In the particular case cited in *Example Two,* the circuit levels should be maintained at 2.7 db. This would also be a case where it is quite doubtful whether the carriers could be operated at sufficiently high levels to overcome the normal line losses encountered and to provide over-all loss circuits of 2.7 db unless voice frequency repeaters were inserted. However, the over-all design objectives of VNL operation do not particularly care "how" but are more concerned with "what." Accordingly, it will be necessary for each individual company to make its own decisions as to the methods used in obtaining the design objectives.

More Capital Outlay

EXAMPLE *Two* is a good instance of a case where additional expenditure will probably be necessary for only a small amount of transmission gain. In other words, it is doubtful whether sufficient stability would be present if the carriers, alone, were used to give over-all circuit gain necessary.

At the start of this series of articles, it was pointed out that it is possible to have a total of 10 links involved in a machine-switched call. This could conceivably consist of eight inter-toll trunks and the two terminating links.

It was further pointed out that the variations, or differences, in transmission qualities, in the individual groups of trunks, could be additive in nature and cause serious differences in transmission levels on successive calls.

Of course, the possibility of obtaining the *worst* circuit in *each* link of the chain is actually quite remote. It follows exactly the same law of probability that governs any happening of

random chance. However, it is enough to say that the allowable variation in circuit quality in toll groups has been narrowed considerably. There are two terms which are used as an expression concerning the variations in quality which can exist on toll groups and affect the maintenance requirement. These two terms are "Bias" and "Distribution Grade."

"Bias"

"BIAS" is defined as "the average departure of the measurements of a group of circuits from their required, or specified, value." It is expressed in db. Objectives for Via and Common Grade inter-toll trunks have been set at $\pm 1/4$ db Bias, while terminal grade repeatered or carrier equipped trunks can deviate slightly more, but not to exceed $\pm 1/2$ db. The method of computing the Bias on a group of trunks is illustrated by the following example:

Calculation of "Bias"

No. of ckts. in group = 6
Design objective = 4 db

Ckt	Measured Loss	"Plus" Departure	"Minus" Departure
1	4.5	.5	
2	5.0	1.0	
3	3.6		.4
4	3.1		.9
5	3.0		1.0
6	4.5	.5	
		+2.0	−2.3

Difference in departure:
+2.0 − 2.3 = − .3 db

$$\text{Bias} = \frac{\text{Algebraic departure}}{\text{No. of Ckts.}} = \frac{-.3}{6} = -.05 \text{ db}$$

In the case illustrated above, the Bias amounted to —.05 db, well within the tolerable limits of ±.25 db.

"Distribution Grade"

"DISTRIBUTION GRADE" is an expression of the spread of the measurements from the average, or bias, value of the group. It is also expressed in db, and should not exceed 1.0 db for Via and Common Grade inter-toll trunks, while Terminal Grade repeatered or carrier equipped trunks should not exceed a distribution grade of 1.8 db. An example of the calculation of Distribution Grade, for the same group of circuits used in the "Bias" example, is given below:

Calculation of "Distribution Grade"

Ckt.	Departure	Square of Departure
1	+ .5	.25
2	+1.0	1.00
3	− .4	.16
4	− .9	.81
5	−1.0	1.00
6	+ .5	.25
		3.47

(A) Average square departure $= \frac{3.47}{6} =$ .5783

(B) Square of "Bias" (from "Bias" example) = .05 x .05 = .0025

(C) Difference (A − B) = .5783 − .0025 = .5758

Distribution Grade equals square root of (C)

$\sqrt{.5758} = .759$ db

In the example, the Distribution Grade of the group of trunks equals .759 db, which is well within the tolerable limit of 1 db.

Tighter Maintenance Policies

ALTHOUGH not too apparent at first glance, this somewhat new definition of limits in variation on circuit groups is much narrower than limits previously considered tolerable. It boils down to tighter maintenance policies and more strict insistence on maintaining transmission levels as closely as possible to their design objective.

This concludes the series of articles concerning a fundamental approach to understanding VNL. I sincerely hope that a small amount of light has been cast on the subject and, if nothing else, will make all of us a little more familiar with the terms contained in the attached "Glossary of Terms."

"Glossary of Terms"

VNL	Listener's Echo
Distance Dialing	Human Limitations
TNL	Human Tolerance
End Office	Waterfall
VNL + 2	Via Net Loss Factors
Bias	Inter-Toll Links
Echo	Terminal Links
Singing	Hybrids
Noise	2-Wire
Cross-talk	4-Wire
Maintenance Variation	Switched Pads
Termination Loss	Fixed Pads
Talker's Echo	Bias
Hollow	Distribution Grade
Rain Barrel	

Note: The above glossary is not intended to be complete but is a summation of some of the terms used in this series of articles.

References

"Notes on Distance Dialing," as revised September, 1956, by AT&T Department of O. & E.

"Industrial Electronics Handbook," — Cockrell.

"Electrical Engineer's Handbook," — 4th Edition — Pender & McIlwain.

"Electronic Communication," — Shrader.

— 73 —

Any comments, criticisms, or suggestions for future topics? Address all correspondence to "Sub-Harmonics and Overtones," Telephone Engineer & Management, 7720 Sheridan Road, Chicago 26, Ill.

TO HELP THE HEART

It's called a "spectral phonocardiogram," which is just a big word to describe recording the heart's sounds and their meanings. This valuable new tool for the medical profession comes from Bell Labs and began in the laboratory of Robert R. Riesz.

The phonocardiogram supplements the electrocardiogram. Riesz gives an informal analogy. "If you were an automobile," he says, "the electrocardiogram would be showing the ignition system. The sound spectrogram would be showing the things you hear when the motor goes — the exhaust, the explosion of gas — the things happening in the plumbing system. A valve leak or murmur might not show up at all on an electrocardiogram."

It's another by-product that has grown out of telephone research.

Electronic Communications

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"Stitched Wiring" Process

OF INTEREST to the telephone industry is a new "stitched wiring" process which has been developed and put in production at Lenkurt Electric Company's San Carlos, Calif., plant. This process is said to have quality and cost reduction advantages over both printed circuitry and hand wiring.

The new type of circuitry makes use of tin-coated bronze staples driven through a black XP phenolic board at predetermined locations, with staple crowns on the component side of the board. The staple legs protrude from the other side to form terminal posts, either for bare wire straps or for component leads inserted through holes alongside the posts. The two sides of a typical circuit board are illustrated in *Figures One* and *Two*.

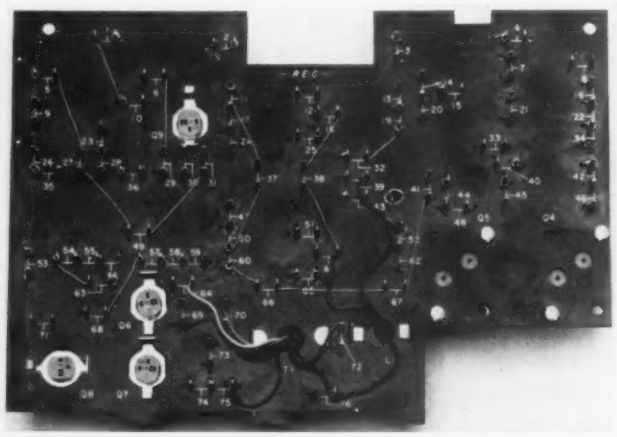


FIGURE ONE: — This is the bottom view of a typical circuit board showing the legs of automatically-inserted staples left unclinched to form terminals. Component leads are inserted through adjacent holes for wire-wrap connections. The wrapping, strapping and soldering may be done automatically. Insulated leads from transformers were added manually after wave-soldering. (Lenkurt Electric Company.)

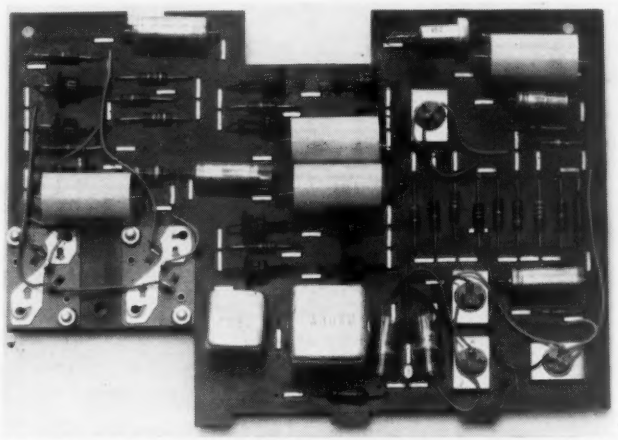


FIGURE TWO: — This view shows the component side of a typical circuit board. Visible are the crowns of staples, which were inserted automatically. When required, long insulated jumpers may be manually added on the component side as shown.

Circuit boards can be tested for electrical continuity before soldering, either by a manual or an automatic procedure. In fact, the entire process can be done by hand or can be automated to the desired degree. Even when fully automated, runs of as few as 50 circuit boards are economically feasible.

To automate the process, the production engineers have added two new procedures of their own design. These are the provisions of automatic stations for wrapping component leads around staple posts and for strapping bare wire between any two posts.

Regardless of the degree of automation, the new process is said to provide advantages in mechanical, electrical, and design characteristics. The circuit boards are claimed to be more rugged than hand-wiring. They are not subject to thermal dislocation as are printed circuits, and have lower distributed capacity than printed

TELEPHONE ENGINEER & MANAGEMENT'S

ELECTRONICS NOTEBOOK

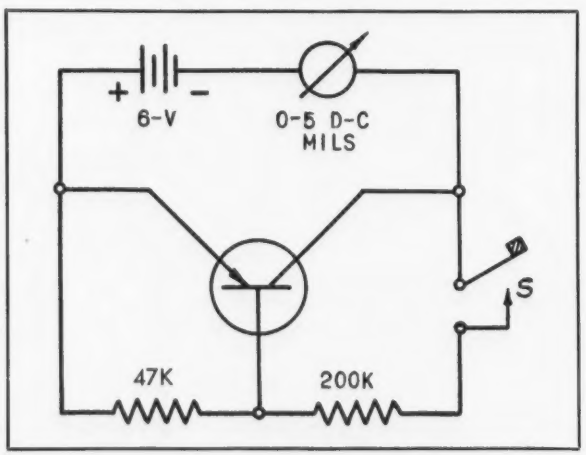
By LEO G. SANDS

6.3-4 COLLECTOR CURRENT TEST (con't.)

Data is usually listed in a transistor data sheet. If the transistor is defective, the reading will be much higher than 3 (BIco).

6.3-5 GAIN TEST

The gain of a transistor (beta) can be measured in various ways. In this circuit the meter indicates leakage when push button S is open. When S is



closed the current reading should increase by at least 10 to 1. If beta is 10, the reading will increase by 10 to 1; if beta is 50, the reading will increase by 50 to 1, etc. For a PNP transistor the polarity of the battery should be as shown. For an NPN transistor, the battery polarity should be reversed.

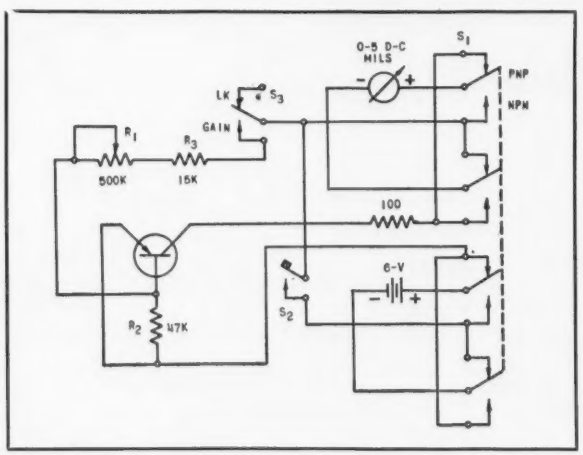
TELEPHONE ENGINEER & MANAGEMENT'S

ELECTRONICS NOTEBOOK

By LEO G. SANDS

6.3-6 COMMERCIAL TESTERS (static type)

The diagram shows the circuitry of the Century model TT-2 transistor tester. Switch S1 converts the tester from PNP to NPN transistors. Leakage is tested by leaving S3 set for LK and by pressing S2. To measure gain R1 is set on its calibrated scale to the rated beta of the transistor to be tested. When S3 is set to GAIN and S2 is pressed, the meter indicates gain in terms of "satisfactory," "weak" or



"bad" on a red-yellow-green scale. If the meter needle stops exactly at the calibrating line on the meter, the gain is exactly as rated.

6.3-7 COMMERCIAL TESTERS (dynamic type)

Some transistor testers permit dynamic testing of

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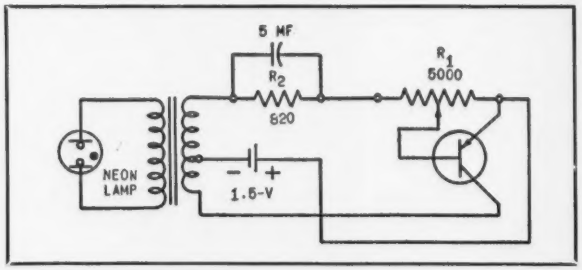
ELECTRONICS NOTEBOOK

By LEO G. SANDS

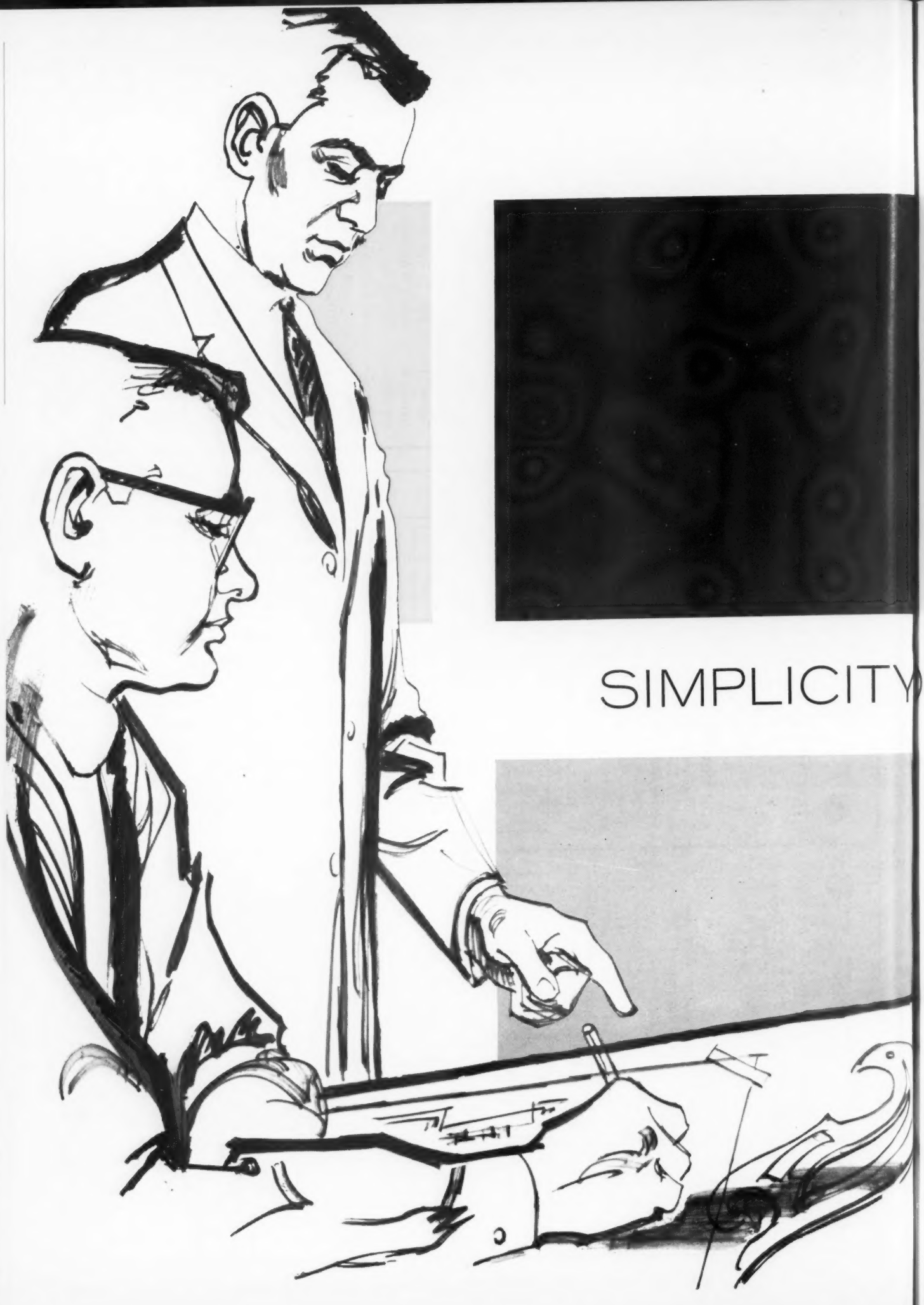


transistors without removing them from their circuits. With the Seco model 100 dynamic transistor tester, the instrument may be connected into a transistor circuit by means of its retractible clip leads. The instrument checks for "opens," "shorts" and "gain." It may also be connected directly to a loose transistor. A socket is provided for testing plug-in transistors.

As shown in the simplified circut, the transistor being tested functions as an oscillator. The relative output of the oscillator is indicated by the brilliance of the neon lamp. When potentiometer R1 is set at zero, base current is maximum. All satisfactory transistors should oscillate at this setting. As R1 is advanced to reduce base current, a point will be reached where oscillation ceases.

The more R1 can be advanced before cut-out, the higher the gain of the transistor. Transistors of the same type can be matched by selecting those which cut out at the same setting of R1.

More Data For Your "Electronics Notebook" in the Next Issue.


SIMPLICITY

When purchasing dial switching equipment, the experienced buyer looks for the product that offers *minimum maintenance.* That's why so many telephone men choose Strowger Automatic. You see, Strowger operates on a step-by-step principle and is made with the simplest possible construction. This keeps adjustments and repairs to a minimum. The position of the switching components permits visual tracing of circuit operation. This speeds training of personnel and makes trouble-shooting quick and easy.

TY OF DESIGN...

another reason why telephone men choose Strowger!

PROVE IT FOR YOURSELF! Visit a Strowger Automatic exchange. You'll see that Strowger offers unsurpassed simplicity in design. You'll also see the craftsmanship and quality construction of this famous equipment. Then get in touch with us. We'll be glad to help you plan for your dial conversion. Write Automatic Electric Sales Corporation, Northlake, Illinois. In Canada, Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16.

AUTOMATIC ELECTRIC GENERAL SYSTEM

Subsidiary of

GENERAL TELEPHONE & ELECTRONICS

boards. Because the conductors are in less intimate contact with the boards, moisture absorption is said to have little effect on board Q. Crossovers and strapping options are easily obtained. Design changes do not obsolete production equipment.

The new process, for which patents are pending, is being used in producing circuit boards for Lenkurt Type 23A "Datatel" telegraph carrier systems now in production. It is planned that "stitched wiring" will provide the circuit boards for future Lenkurt carrier and the low frequency portions of radio systems.

"Error-Free" System

AN ERROR-FREE communications system that "hangs underground" is the latest advancement here in America's growing strength in the ballistic missile program.

Developed for the U. S. Air Force's Titan by International Telephone and Telegraph Corporation-Kellogg Division, the system employs the first sub-surface switching apparatus in the entire missile and space program to launch the two-stage ICBM weapon from an underground silo or "hardened" site. Equipment is suspended in caissons below ground to provide a high degree of physical balance in shock waves and pressures that would be generated by possible enemy nuclear attack.

Engineering extremes in both theoretical studies and actual physical testing were required for the development of this equipment to determine the ability of communications to withstand nuclear shock.

The system is so designed that an order or message always "gets through" when it must, regardless of momentary situations, interferences, interruptions or any elements of human error. Any specific function built into the system is performed as needed, to the exclusion of all others.

The communications system is made up of eight distinct operations, including administrative communications, operational communications, page and countdown, camera control, fire alarm, operation direct line, maintenance and checkout, voice recording and range safety.

The camera control system provides sequential photographic documentation of each launch for purposes of engineering study, analysis and review. As the intense heat of the first firing engines melts the lenses of the cameras nearest the launch site, an automatic switch over to outlying cameras is effected to continue documentation.

Similarly a documentary record of all commands and instructions is obtained from the voice recording system, consisting of both recording and playback equipment. This system is integrated with the operational direct-line communications system which provides rapid-push-button communications for selected command, operational, certain maintenance, and check-out activities.

The public address and alerting system provides emergency communication to the various operational, administrative and maintenance areas. With loudspeakers located in rooms, corridors, and outdoor locations, this system is interconnected with the telephone switchboard to permit telephone handsets to be utilized as public address microphones, enabling certain telephone users to broadcast messages over the public address system by simply speaking into a telephone.

The dial telephone system, which handles the communications for administrative functions of the complex, serves as an emergency communication facility for the command and operating activities should direct line communications be disrupted. The design of a dial system allows telephone stations to retain the same directory number even though moved to new locations.

An "executive-right-of-way" feature permits a telephone with an appropriate class of service to over-ride a conversation on a dial telephone line or a message being broadcast over the PA system from a dial telephone line.

Kellogg communications also provide the critical ground support to the Samos (formerly known as Sentry) reconnaissance satellite at Point Arguello as well as to Discoverer space satellite and all Air Force missiles at Vandenberg.

Sampling Oscilloscope

NEW HIGH-SPEED electrical stroboscope, or sampling oscilloscope, was described by W. M. Goodall and A. F. Dietrich of Bell Telephone Laboratories, Holmdel, N. J., in a paper to the IRE Professional Group on Microwave Theory and Transmission. The new instrument has an effective bandwidth in the order of 5,500 megacycles, and a rise time in the fractional millimicrosecond range.

In high speed, short pulse studies, oscilloscopes are employed to observe repetitive pulse patterns. However, the microwave transistor recently developed by Bell Laboratories and Esaki (tunnel) diodes operate too rapidly for conventional oscilloscopes to follow, since typical broadband amplifier oscilloscopes cannot combine sensitivity with fast rise time.

In the case of an electrical stroboscope, the rise time is primarily a function of the bandwidth of the sampling circuits, and sensitivity depends on the gain of the amplifier in the low frequency

portion of the oscilloscope. The penalty paid for these advantages is the time required for integration or combination of the sampled pulses. (The principle involved in the operation of an electrical stroboscope is similar to that of a light stroboscope, which appears to slow down or "freeze" motion in a moving part by illuminating the part with short recurrent flashes of light.)

In the newly developed instrument, a gallium arsenide crystal operates as a gate which is opened briefly by pulses from a high speed pulse generator to observe short samples of the signal pulse. The final signal observed on the low frequency oscilloscope display tube is the result of integrating a large number of these samples. This integration takes place in a somewhat similar manner to the fusion of samples that takes place in the eye, when watching a light stroboscope.

When the signal pulse and the strobe pulse occur at the same rate, the stroboscope continues to look at the same part of the electrical signal, comparable in a sense to a light stroboscope freezing the motion of a rotating shaft. If the two frequencies are slightly different, the signal interval is scanned repetitively in the same way that a moving part appears to move slowly when the light frequency differs slightly from rotational frequency.

The new instrument is being used in studies of binary pulses in the range of 1000 megabits, or a billion bits per second. Its over-all sensitivity is 2 mv/cm. They showed oscillograms of 160 mc square waves, and of 640 million pulses per second, with a rise time for the wave forms of as fast as 2×10^{-10} seconds (200 picoseconds). Further tests indicate that rise times at least as short as 1×10^{-10} seconds (100 picoseconds) can be displayed satisfactorily.

The short pulses needed for the electrical stroboscope were generated by clipping a combination of a 10 mc pedestal pulse and a high amplitude 320 mc sine wave.

Electronic Ear

NEW ELECTRONIC ear, considered to be one of the most sensitive listening devices invented to date, and keen enough to pick up faint radio signals from interplanetary rockets, has been developed for the U. S. Army Signal Corps by Hughes Aircraft Company. It is the smallest and easiest-to-operate device of its kind, and could extend by tenfold the sensitivity and range of many Army electronic systems.

The super detector is a 25-pound ruby maser, which gets its name from the ruby gem, its heart, and from the scientific phrase describing its use: Microwave Amplification by Stimulated Emission of Radiation.

U. S. Army's Super Detector. Pvt. Henry Hahlbohm (Long Island City, N. Y.) listens to a signal picked up by a new experimental "ruby maser," a device that is pound for pound the most sensitive detector in the history of science. The maser, which can increase the range of important military communications and radar systems up to tenfold, is being tested at the U. S. Army Signal Research and Development Laboratory. (U. S. Army photograph.)

The device is now under test at the U. S. Army Signal Research and Development Laboratory, Fort Monmouth, New Jersey.

Used as an amplifier for radio and radar, the new maser could provide the kind of sensitivity needed to:

(1) Detect radio "beeps" from space vehicles millions of miles away, making it possible to communicate with satellites or track space probe missiles at far greater distances than ever before.

(2) Enable U. S. military defense systems using long-range high-angle radars to detect intercontinental ballistic missiles far earlier than they can now.

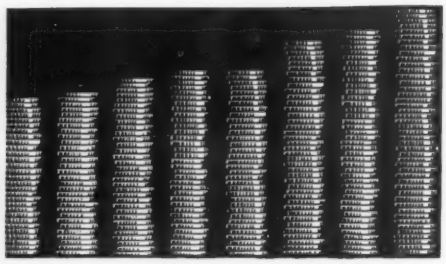
(3) Pick up signals from distant stars for use in radio astronomy.

(4) Increase the range of communications between future manned space vehicles.

In operation, a special 2-carat synthetic ruby inside the maser is cooled to 452 degrees below zero Fahrenheit — about as cold as any object in the universe can become. At this temperature the jewel can detect and amplify almost imperceptibly faint radio signals.

The ultra-cold temperature, maintained by immersing the ruby in liquid helium, causes atoms and electrons in the gem to move in slow motion. This cuts the "noisy" collisions of the atomic particles to a minimum. The result is an almost static-free signal booster. Conventional amplifiers, using hot radio tubes or room-temperature transistors, themselves create enough radio noise to drown out faint signals. This is the hissing, rumbling background noise heard, for instance, when a home radio strains to pick up a distant station.

SLUGS IN THE COIN BOX



One coin box contained $8.00 in quarter-size slugs. Another gave up $27.75 in quarter-size magnetic slugs. It was a bad month for coin collections, and a good month for the slug users! What to do about it?

By ALLAN R. STACEY

SPREAD out on the counting table before me was the sum of $27.75 in quarter size magnetic type slugs taken from the coin collection box at our West Way Service Station. Thus, we knew that in an adjacent housing tract, the electricians were busy installing conduit and wiring for here were some of their washers and slugs.

This was not a small loss for the $27.75 amount of slugs compared to a total amount of cash in the box of $40.85. I understand that across our country during 1959 approximately $800,000 was lost in the Bell System alone from slugs and other devices inserted in coin telephones.

The following month in the coin box of West Way Service Station we found $8.00 worth of quarter size slugs and the next month $6.50 worth. We were also having a similar problem with coin telephones in one of our major shopping supermarket areas. What to do about it?

Paystation Anti-Slug Ejector

FORTUNATELY, to answer our problem an anti-slug ejector is now available for paystation instruments. While it doesn't prevent the usage of all types of slugs and foreign money, it does stop deposit of most 25 cent size slugs.

Basically, the device is a magnet which will pull the slug away from the 25 cent gong so that no signal is sounded to the operator. When the slug is used in postpay or semi-postpay paystation equipment the slug is diverted away from the gong and drops into the cash box.

When the ejector is used with a prepay type pay telephone, the slug is diverted away from the gong and goes into the coin hopper. Since the operator does not receive a gong signal on this deposit of a "quarter," she normally requests the customer to redeposit the coins after she has returned them to him. Most likely this will discourage him from a second usage of the slugs.

Results Of Using The Ejector

IN OUR own company we soon found that slug ejection equipment could be placed upon a coin telephone that was experiencing heavy usage of slugs and then removed shortly thereafter without reestablishment of the pattern of slug usage. For example, on the West Way Service Station mentioned above, after three months of heavy slug deposit we installed a slug ejector and left it for ninety days. At the end of ninety days we removed it to use elsewhere but found no further usage of slugs at that location during the following twelve months.

Available On New Instruments

I AM informed by one of the suppliers that the anti-slug ejector has become standard equipment on all new paystation instruments at no increase in cost to the telephone company. This is a fine thing, but what do you do about the older instruments that will still accept slugs? There are two answers: convert them or move them.

You may remember how we went through the process of converting 5 cent paystations to 10 cent operation. Most of us made use of a conversion kit and often converted the instruments in the field without ever bringing them into the shop. I am happy to report that there is an anti-slug ejector conversion kit now being made available which will permit addition of anti-slug ejection to paystations now in the field. The kit is available at a nominal price and will certainly pay off very quickly in view of the losses that it will diminish.

I understand the kit is limited to paystation instruments which have been manufactured later than 1950. However, where slugs are being experienced with older type instruments, it may be possible to transfer the upper housing from one of the newer types containing the anti-slug ejection mechanism and thus make that paystation location slug proof. In the event it isn't possible to transfer upper housing, then it may be necessary to substitute a complete new instrument in that location for a short time. As described above, it has been our experience that it is not neces-

sary to leave the anti-slug telephone in one location for long periods of time in order to become effective in stopping the usage of slugs.

Well, enough about slugs for now. If you want more ejector information, please drop me a line.

Losses By Your Own Employes

MANY companies have procedures established whereby protective steps are taken to prevent loss from their own employes collecting coin telephones. I think this is an excellent precaution and it should include several protections.

Certainly the personnel should be rotated occasionally and the result checked to see if cash collected varies radically with change in personnel.

Secondly, a spot check should be made at the coin box in the field by two persons counting the coin and redepositing it in the coin telephone immediately prior to the scheduled collection of the paystation collector. Such a spot check ought to be conducted not less than twice per year on enough telephones and enough coin collectors to give some relative assurance of honesty in these collections.

Some companies make use of locked coin boxes which the paystation collector, at least theoretically, is unable to open and thus insure safety of the funds. However, it has been my experience that the spot check method is more beneficial because these locked type boxes are far from foolproof.

Losses By Burglary

MOST companies are experiencing losses by professional and amateur burglars taking the complete instrument or removing only the coin from pay telephones. Our manufacturers are constantly working on design changes and structure reinforcements to make it ever more difficult for burglary to occur. It seems to me as far as the professional burglar is concerned we are going to have difficulty really stopping him completely. However, we do have some hopes of stopping the amateur who takes a crowbar or some other tool and pries the telephone off the wall and then makes off with it and at his leisure tears it apart to get at the coin.

In some cases alarm circuits can be helpful when received into the central office or some other permanently manned location and thus warn of burglary in process. When this alarm comes in, the local police department can be notified and, if they are rapid enough, may apprehend persons stealing the coin from the instrument. In our own company's history in at least one case, the police picked up a man within ten minutes after he had committed a burglary under such circumstances.

Frequent abuse of coin telephones comes from school age young adults. One effective technique that interested me several years ago was placing a camera in the overhead section of the booth so arranged that an infra-red picture would be taken of anyone vigorously jiggling the instrument. These pictures were subsequently shown to the school authorities and appropriate steps were taken by the authorities rather than by the telephone company. This specially equipped telephone booth was transferred from one location to another as the need arose.

What Ideas Do You Have?

CERTAINLY no one has a monopoly on all the good ideas for preventing theft from coin telephones. Would you please let me know what method you have found to be effective with this problem? I am sure that other companies would benefit by whatever knowledge you can share.

Appeal To The Manufacturers

NOW, MAY I take this means to make a direct appeal to those who manufacture paystation instruments. It seems to me that the industry would benefit if the design were changed so that the talking part of the instrument is separated from the coin collection part. Someone stealing the coin telephone, simply to get at the money, is under the present situation taking an instrument which costs the telephone company as much as $175.

If we had a coin receptacle that was separate from the talking parts of the instrument, we would not lose an investment of $175. but merely whatever was associated with the far less expensive separate coin box. Many is the time that we have found a coin telephone badly mangled and cast away in bushes along the highway after a burgler has extracted the nickels and dimes. The telephone has been damaged beyond repair by the time we recover it.

Manufacturers, what can you come up with?

Well, that's all for now. Next issue we'll be talking about a handbook for the commercial representative — see you then. — *Allan R. Stacey.*

FREE LITERATURE

Multiplication Factors

CONVERSION FACTORS is a 21-page pocket-size compilation of multiplication factors involved in converting fundamental electrical and magnetic units.

Over 800 conversion factors will provide practicing engineers with information that is normally scattered throughout technical literature.

The booklet (Circular 1956) may be obtained without cost by writing *Automatic Electric, attention, Director of Control Equipment Sales, Dept. TE&M, Northlake, Ill.*

Instruments Catalog

Products of the Transducer Division of Consolidated Electrodynamics Corp. are described in a new 16-page general catalog.

Design details and applications of pressure instrumentation, force-balance instruments, unbonded strain-gage and potentiometer pressure transducers, vibration transducers, accelerometers, etc. are featured.

Copies of Bulletin 1308 can be obtained from *Consolidated Electrodynamics Corp., 360 Sierra Madre Villa, Dept. TE&M, Pasadena, Calif.*

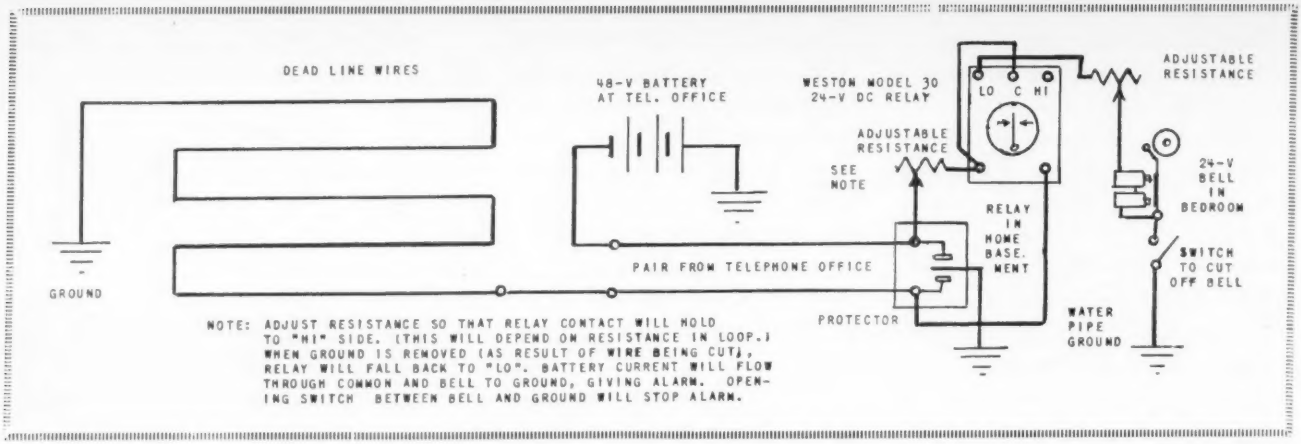

DEAD LINE WIRES
48-V BATTERY AT TEL. OFFICE
WESTON MODEL 30 24-V DC RELAY
LO C HI
ADJUSTABLE RESISTANCE
ADJUSTABLE RESISTANCE
SEE NOTE
24-V BELL IN BEDROOM
RELAY IN HOME BASE-MENT
SWITCH TO CUT OFF BELL
PAIR FROM TELEPHONE OFFICE
GROUND
PROTECTOR
WATER PIPE GROUND
NOTE: ADJUST RESISTANCE SO THAT RELAY CONTACT WILL HOLD TO "HI" SIDE. (THIS WILL DEPEND ON RESISTANCE IN LOOP.) WHEN GROUND IS REMOVED (AS RESULT OF WIRE BEING CUT), RELAY WILL FALL BACK TO "LO". BATTERY CURRENT WILL FLOW THROUGH COMMON AND BELL TO GROUND, GIVING ALARM. OPENING SWITCH BETWEEN BELL AND GROUND WILL STOP ALARM.

FIGURE ONE: — Diagram of wire-theft alarm in Claude Downard's home. The circuit was wired through rural distribution wire and exchange cable, a total distance of four miles to the near end of the lead copper wires. Total loop resistance to ground was about 1000 ohms.

PLANT ENGINEERING NOTES

By JOHN S. REED

Alarm System Traps Wire Thieves

PROPERTY theft is sometimes a problem to business organizations, and telephone companies on occasion have had to take action to stop the stealing of outside plant facilities.

An increasing number of wire thefts in Jefferson County, Mo., led Claude Downard, manager of the Potosi Telephone Co., to devise an alarm system on telephone lines in the county. The alarm arrangement diagramed in *Figure One* eventually trapped four Washington County men in the act of stealing copper line wires of the Potosi Company.

The authorities were led to the scene after Mr. Downard informed them that the alarm had been tripped. Mr. Downard was on the scene when the capture took place.

New "Figure 8" Alpeth Cable

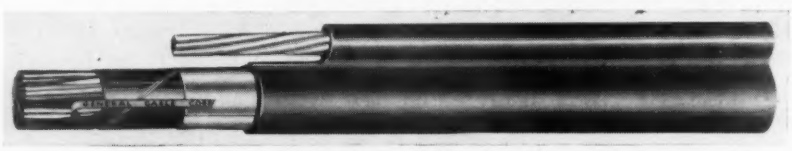
GENERAL CABLE Corporation has produced a new type of cable that may well revolutionize the present cable construction methods. This cable (*see illustration*) is composed of two essential elements, the cable core and the messenger, over which a continuous polyethylene jacket is simultaneously extruded. A polyethylene web is formed during extrusion as a bond between these components, forming a "Figure-8" configuration. As a result, this cable has the unique characteristic of being a combined messenger and core as a single unit, economically produced for quick and low cost installation.

The configuration of the strand and cable core is such as to give their cross section the appearance of a figure "8", hence the apt term "Figure-8" cable.

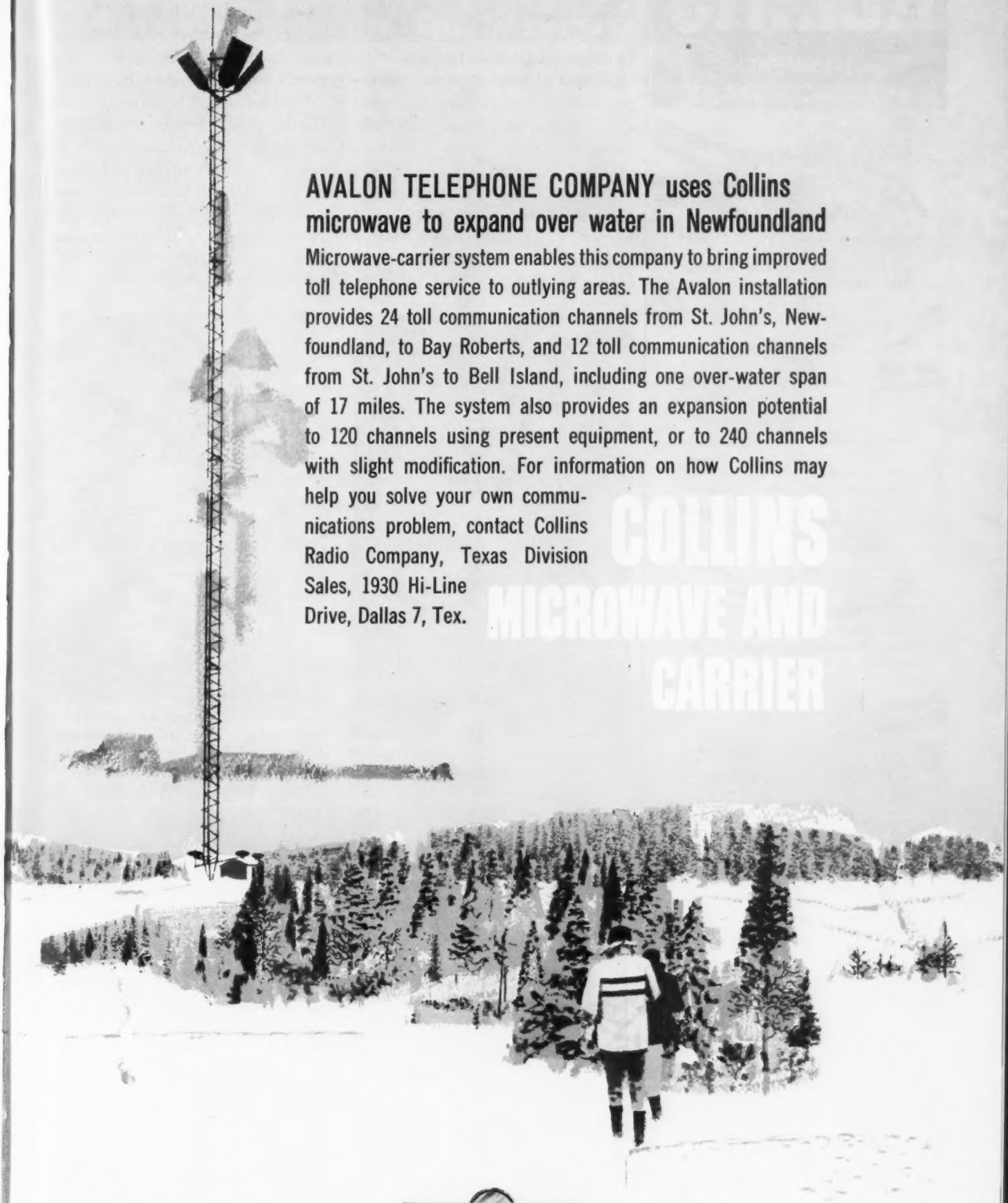
The new cable is said to simplify the installation process, allowing the two previous separate components to be installed at the same time in one operation, in contrast to the previous method of separately stringing the messenger strand and subsequently spinning the cable to the installed strand.

To facilitate the installation of the Figure-8 cable, a special clamp (*see illustration*) was developed for tangent supports which grips the jacketed messenger. The method of dead-ending the cable is also illustrated on page 58. Any type of dead-end grip may be employed for the purpose.

The cable is easily installed in the same manner as in the conventional procedure of placing messenger strand. In this case, the cable is raised to the special clamp on each pole by means of a tool similar to a wire-raising device. The cable is laid in the stringing finger of the clamp. After the cable is sagged to the pro-



Construction of General Cable Corporation's Figure-8 Alpeth cable.



AVALON TELEPHONE COMPANY uses Collins microwave to expand over water in Newfoundland

Microwave-carrier system enables this company to bring improved toll telephone service to outlying areas. The Avalon installation provides 24 toll communication channels from St. John's, Newfoundland, to Bay Roberts, and 12 toll communication channels from St. John's to Bell Island, including one over-water span of 17 miles. The system also provides an expansion potential to 120 channels using present equipment, or to 240 channels with slight modification. For information on how Collins may help you solve your own communications problem, contact Collins Radio Company, Texas Division Sales, 1930 Hi-Line Drive, Dallas 7, Tex.

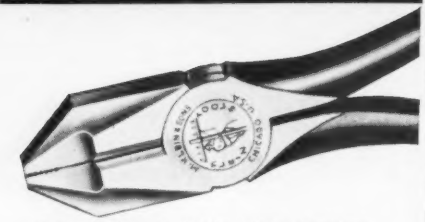
COLLINS MICROWAVE AND CARRIER

COLLINS

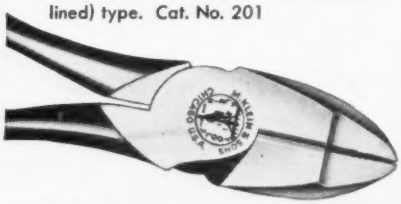
COLLINS RADIO COMPANY • DALLAS, TEXAS • CEDAR RAPIDS, IOWA • BURBANK, CALIFORNIA

KLEINS

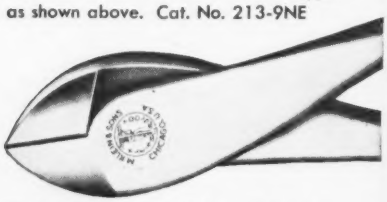
for LINEMEN and ELECTRICIANS



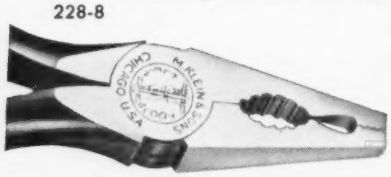
The Original Klein Side Cutting Plier—Also available in NE (Streamlined) type. Cat. No. 201



High Leverage Plier—Extra high leverage permits cutting extremely tough wire. Also available in the standard type as shown above. Cat. No. 213-9NE



High Leverage Oblique Cutting Plier—A recently introduced plier designed to cut toughest wire. Cat. No. 228-8



Electrician Conduit Plier—Reams inside and outside of conduit, tightens lock nuts in outlet boxes. Cat. No. 333-8

"Since 1857" the name Klein has stood for the finest in tools and equipment for linemen and electricians. It is the uncompromising high quality back of the name Klein that has won Klein Pliers their place in the hands of men who know good tools. Klein Pliers are now available in a wider variety of styles and sizes than ever before. Be sure the pliers you need carry the Klein trade-mark.

Klein Catalog Free—This new Klein catalog giving complete information on Klein tools and equipment for linemen and electricians will be sent on request. Write for your copy.

Ask Your Supplier—Foreign Distributor: International Standard Electric Corp., N.Y.

Mathias KLEIN & Sons
7200 McCORMICK ROAD • CHICAGO 45 ILLINOIS

per tension the messenger is placed in the jaws of the clamps and the jaws tightened over the plastic coating of the messenger.

Initial trial installations were made by the North Carolina Division of the General Telephone Company of the Southeast to develop the methods and materials needed to properly support the cable.

Using the improved materials, a recent installation of General Cable's Figure-8 cable was made at Georgetown, S. C. The cable was placed by a construction crew that had never before handled this kind of cable. The average time for the job was 5 manhours per 1000 feet, compared to approximately 32 manhours required for conventional cable lashing to messenger. This company expects the cost differential to increase as their construction crews gain more experience.

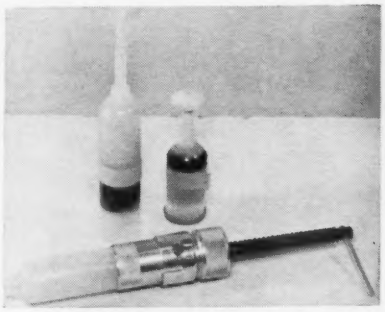
The Figure-8 cable differs from the Alpeth cable lashed to a messenger only in that the lashing wire is replaced with a polyethylene web. Since the new Alpeth telephone cable core and jacket are of the same high quality construction as the two separate components, standard closures can be employed in splicing the cable.

Using a raising tool to bring Figure-8 cable to attachment on pole.

Dead-ending General Cable Figure-8 cable using a standard dead-end grip. (Preformed Line Products Co.) Any standard dead-ending arrangement may be employed.

Use of special cable clamp (Malleable Iron Fittings Co.) for supporting General Cable Figure-8 cable.

NEW PRESSURIZED CABLE DAMMING METHOD



The introduction of Semco Sales & Service, Inc., two-part SemKit, has eliminated the problems of mixing and applying resin to pressurized cables. Eliminates incorrect proportioning from one container to another for the mixing operation. Material after mixing will not contaminate the applicating gun.

Mixing of the SemKit is done by:

1. Removing tape Clinch band from cartridge.
2. Pulling dasher rod to neck of cartridge.
3. Deforming the foil barrier to combine base and activator for mixing.
4. Rotate Dasher assembly in a clockwise motion until material is completely mixed
5. Pull dasher rod to neck of cartridge and remove.
6. Place cartridge in 755 Screw Gun for application.

APPLICATION OF THE RESIN

Place mixed cartridge into 755 screw gun and lock in place with stainless steel retainer screw in fitting from cartridge to injection fitting and apply.
After application remove cartridge from gun and discard.

No cleanup of gun.

No contact with the resin.

No possible chance of skin contact with the resin.

No clean up of personnel.

Numerous operating telephone companies are now using this method of application. Better application methods reduce costs.

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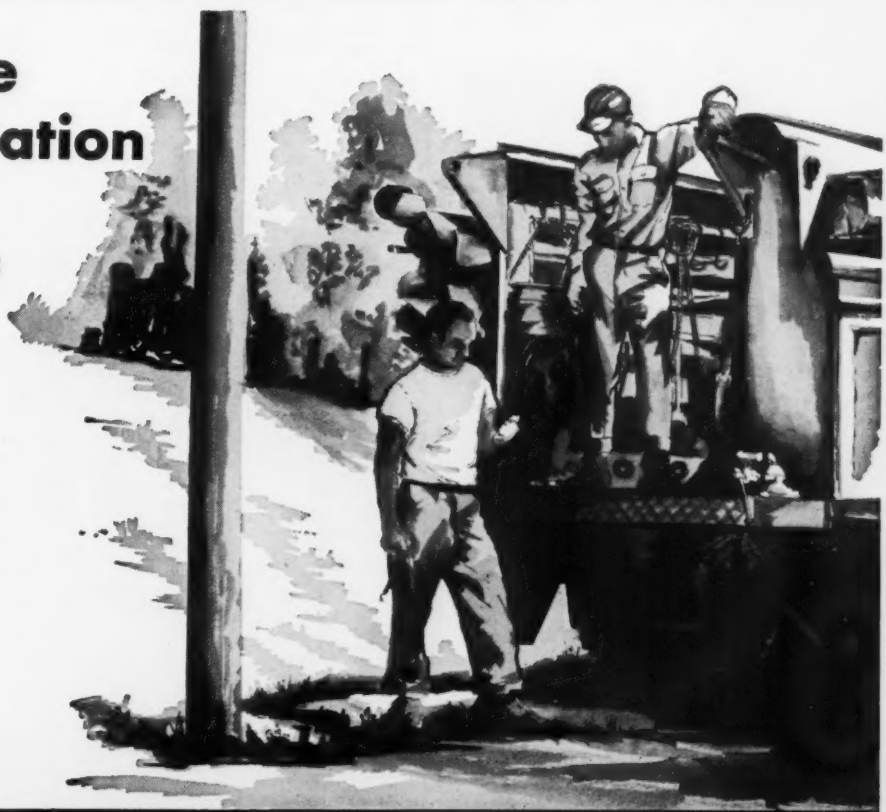

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Chicago 10, Illinois

New Outside Booth Light

OUTDOOR telephone booths must be frequently patronized by the general public to produce good revenue. Experience with various booth colors and signs indicate that bright colors and lighted signs are an important factor in increasing booth usage.

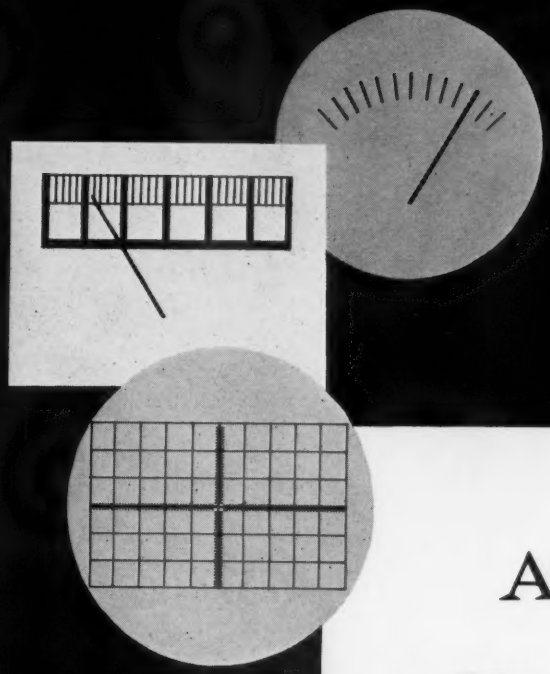
A novel type of outside booth light recently was developed for mounting on the flat roof of an outdoor booth by R. P. Corp., St. Louis, Mo. It has an automatic circuit breaker which turns the light on four seconds and off three seconds. The light is blue in color to contrast with neon signs in the near vicinity.

The unit, distributed by Leich Sales Corp., consists of a blue acrylic bowl attached to a cast aluminum base with snap ring. The installation is simple, requiring only the making of a ½-inch hole in the top of the booth for running wires to the light. The base of the light covers the hole and is attached to the roof with a special metal-to-metal adhesive on the bottom of the base. The adhesive is activated at the time of installation with acetone supplied with the unit.

Outside booth light recently developed by R-P Corp.

The over-all dimensions of the light bowl and base are 8 inches diameter and 8 inches height. A 115-volt 60-watt bulb provides the light source. The unit price plus installation cost are said to be low.

New outside booth light mounts on the flat roof of the outdoor booth.



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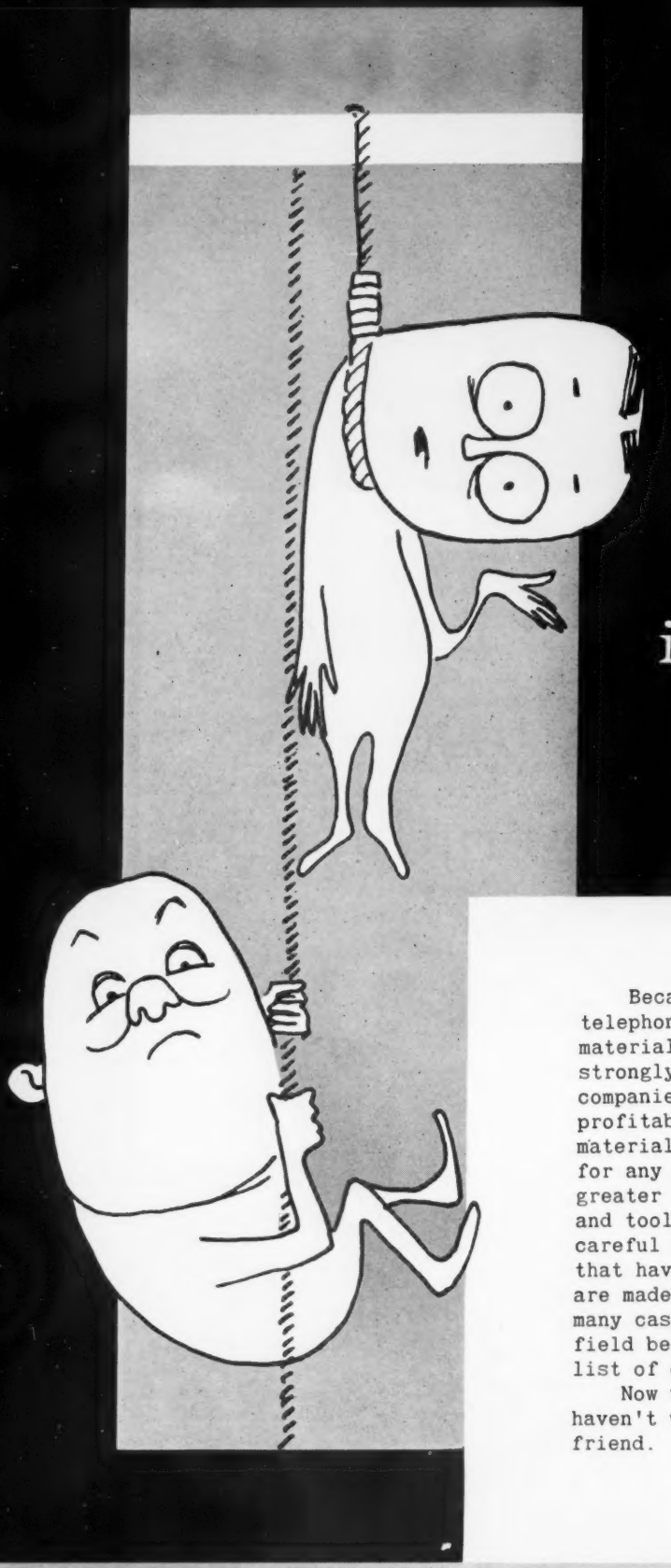

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The REA Borrowers Conference held during the first day of the convention brought a full house and lively discussion from the floor. Participating as panelists were: J. J. WRIGHT, vice president, Crane Engineering Co.; K. J. JACKSON, rates and research department, Wisconsin Public Service Commission; E. C. WEITZELL, deputy assistant administrator, REA; D. J. KILLOREN, president, Killoren Co.; and E. L. BEYL, president, Osceola Farmers Mutual Telephone Co. Moderator was RAY J. RIORDAN, secretary, Wisconsin State Telephone Association.

Wisconsin State Telephone Association Notes Half Century of Progress

"TO PROTECT, promote and effectuate the mutual interests, stability and efficiency of telephony in the State of Wisconsin" was the purpose for which the Wisconsin State Telephone Association was founded 50 years ago.

Fulfillment of that purpose was clearly evident at the organization's recent golden anniversary convention at the Plankinton Hotel, Milwaukee.

Almost a century in the history of the telephone industry was represented in more than 40 booths, exhibiting the latest in modern phone equipment. Also on display were pieces of phone equipment of a much earlier vintage, dating back to two years after the telephone was invented in 1876.

One of the most interesting pieces of earlier phone equipment was loaned to the association by the La Crosse Telephone Co. The telephone operator's set, one of the many vintage pieces in the museum, was manufactured in 1878 — two years after Alexander Graham Bell uttered his famous words over the first telephone.

Many old phone books, with strict warnings for party line users "not to listen in on your neighbor's private calls," told of the industry's early days.

No longer is today's phone user required to whirl the arm crank to place a call. Instead, through the latest innovations in equipment, it takes but a few seconds to complete a call from Maine to Washington or from Wisconsin to California.

Much research and development by members of this association and similar organizations has changed the telephone into a convenience, rather than a nuisance.

Telephones are no longer ugly objects to be hidden behind some door, but instead modern styling and colors have brought the telephone into almost every room in the house.

Featured convention speakers included USITA President Foster B. McHenry, Jefferson City, Mo.; Gov. Gaylord A. Nelson; Leonard Bessman, chairman of the Public Service Commission; Paul A. Harvey, ABC news commentator; Dr. Miles J. Mar-

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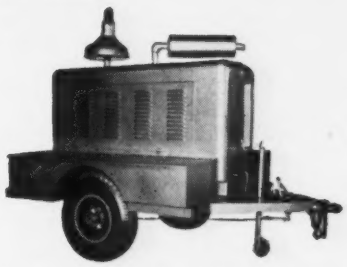

Units provide both single phase power for lights and 3-phase power for other needs. Many exchanges in an area can be served by a single unit.

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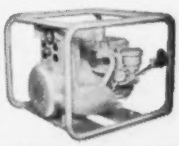

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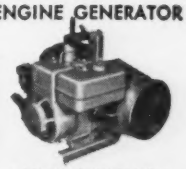

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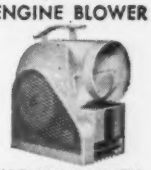

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tin, Schenectady, N. Y., manager of research information, General Electric; E. C. Weitzell, Washington, D. C., deputy administrator of the REA; F. H. Schafer, president, Wisconsin State Telephone Association, and association Secretary Ray J. Riordan.

At the opening session President Schafer told the convention that "great strides have been made in the progress of our association since 1910."

"Many advances have been made in the advancement of the industry we represent," he said, "and in the scope and value of the services provided by our association to member companies in the state during this 50-year period . . ."

Emphasizing that members owe "a debt of appreciation to the founders of our association and those who brought it through the trials and tribulations of its early existence," President Schafer stated "there is real value in united effort."

"Sometimes," he said, "we tend to overlook these services and benefits and are tempted by other trade organizations in quest of the membership dollar. I have no quarrel with them but it seems only reasonable that the undivided support of a single association will, in the long run, prove more rewarding than the expenditure, among many, of funds available for trade organization work. To do the job expected of him our secretary should have the backing of members 100 per cent, and to accomplish the job expected of it an association needs not only the spirit of its members but their financial support as well."

Looking to the future, the Wisconsin Association President said "The matter of providing telephone service shall become more complicated rather than simplified."

"More responsibility will fall upon our association in the united effort to meet these complications," he stated. "Demands upon our trade organization will continue to grow, as they have since it became a full time operation eight years ago . . . In the days and years that lie ahead we will be charged with the responsibilities

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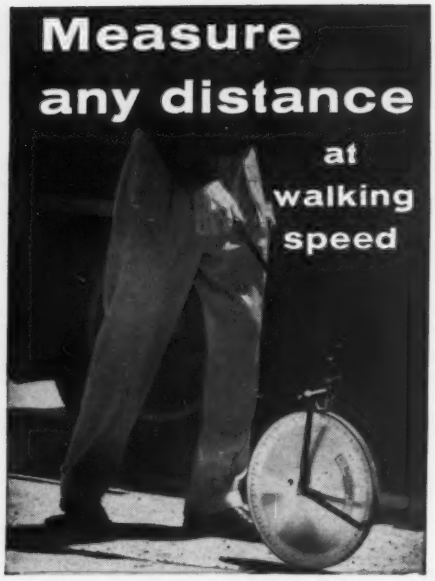

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Discussing income that will permit high standards of maintenance, Schafer stated that low rates of return on rate base may be conducive to low maintenance standards.

"We need to arrive at, and place in effect, a realistic rate of income, fairly related to costs," he said, "just the same as any other legitimate business, if we are to maintain our properties well and continue to progress with other industries, and provide good service to our customers. Regulatory authorities of some states are giving consideration to use of replacement cost figures as a base when establishing rates. . . ."

The chairman of the Wisconsin Public Service Commission (PSC), Leonard Bessman, told the convention that he shuns social contacts with members of regulated industries.

While there is nothing inherently wrong in an occasional drink and friendly talk between the regulators and the regulated, said Leonard Bessman, such socializing diminishes public confidence.

"I think this is one of the inhibitions of our position," he said. "The public expects high standards of conduct."

Bessman said that attempts by in-

To carry out the Golden Anniversary theme of Wisconsin's 50th Anniversary Convention, wives of officers and directors and members of the ladies committee donned 1910 costumes. Shown here in the role of operator is MRS. RAY J. RIORDAN, Madison, and MRS. D. H. HANSEN, La Crosse, as the subscriber.

terested parties to discuss pending cases with commission members was reprehensible, and as bad as a lawyer talking privately to a judge about a case under advisement.

He noted, without mentioning names, that various regulatory officials had been under fire recently for their conduct with members of regulated industries. "This is something that has never happened on the commission (PSC) to my knowledge."

While ruling out social contacts, Bessman said that the PSC welcomed business calls of regulated companies that wished to report on progress of their industries or their problems.

Bessman, a Milwaukee lawyer and a Democrat, was appointed to the PSC last summer by Gov. Nelson.

He said that the whole matter of regulation was under scrutiny. Some persons have been saying for a long time that regulation has failed and that the only answer is outright public ownership of utilities.

Some industries say that regulation is not needed, he said, and could be eliminated at a great savings.

"There is probably something to be said for each viewpoint," Bessman declared. Most important, he said, is that regulated companies and regulatory bodies face up to the fact that both are public servants.

The companies are entitled to a fair return, he said. He quoted Justice Brandeis, however, as saying that an investor in a public utility must recognize that it is not a speculative venture and that he cannot expect big returns on his investment.

L. J. Robertson, general manager of the Platteville Telephone Co., was elected president of the Wisconsin State Telephone Assn. at the closing session of the convention.

Other officers elected were D. H. Hansen, state manager of the La Crosse Telephone Corp., vice president, and Ray J. Riordan, Madison, secretary-treasurer.

Three new directors were elected to the board: William Rowland, vice president of the General Telephone Co. of Wis., Madison; Tony Gotstein, president of the Casco Telephone Co., and George Griffin, president of the Amery Telephone Co.

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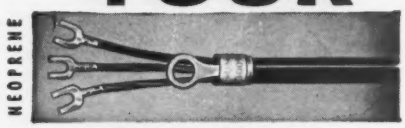

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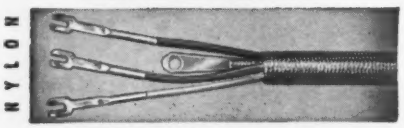

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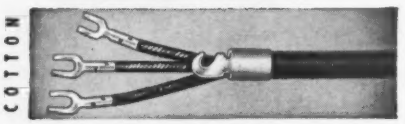

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Illinois telephone men made a Round Table Clinic on outside plant construction rate as a top feature of the 55th annual convention of the Illinois Tel. Assoc.

Illinois Association Meets At Springfield: Daniel Schaefer Elected President

THE president of the Illinois Telephone Association, K. L. Schroeder, addressing the 55th annual convention of the Illinois Telephone Association in Springfield, said that industry members are faced with the challenge and responsibility of doing a better iob.

"I believe there is room for improvement in many ways," Schroeder said. "Perhaps we are like the farmer who told the book salesman that he didn't need any of his high falooting books on farming because he wasn't farming now half as well as he knew how."

Pointing out that many companies compare their annual reports with those of other telephone companies and decide they "are doing all right" when they come up to the average of the other companies, President Schroeder emphasized "That kind of thinking can be dangerous."

"Take the case of the statistician who drowned in a river whose average depth was only three feet," he said. "Do you know what you are when you're average? You're the best of the lousiest and the lousiest of the best . . ."

Referring to "Human Values" and "Enlightened Leadership" as the keys to business success, Schroeder states that "If management consists of getting th'ngs done through people, then the more people do, the better the job management is doing."

"Do the people who work for you actually believe, at the end of the year, that they are better workers and can do more because you have been their boss?" he asked. "Do they really sense and feel your leadership? If they do, then your people will have more knowledge of the job and more skill because you have provided means for them to acquire them."

Emphasizing that motivation can be termed a "blood relative of human values," Schroeder stated that proper attention to the human side of business will produce the stimulus to get things done.

"The first requirement to stimulation is to believe in people," he said. "If you do not believe your employes are capable of better performance, or accepting greater responsibilities, then you are probably not giving them an opportunity to do so. Do you work at training people? Do you let them make mistakes as part of the cost of growing?"

Referring to the provision of adequate incentives and rewards for effort as another element in motivation, Schroeder pointed out that if a job is well done this factor alone will stimulate motivation, "but the opportunity for advancement and financial betterment must be kept in balance with performance at all times."

"A third requirement in motivation is recognition," he said. "Recognition of the importance of and the

satisfaction that comes from any job well done is of great concern to employes. The desire to serve a useful purpose in life is one of the most deeply rooted human instincts. In short, give credit where credit is due."

Following through on President Schroeder's remarks regarding the "challenge and responsibility of doing a better job," the Illinois convention featured a "Round Table Clinic" consisting of 13 tables with the following subjects assigned to a panel of experts at each table: Outside plant construction; engineering inside and outside plant; substation equipment; transmission; dial conversions; telephone directories; rates for new service; business office procedures; central office administration; dial equipment administration; traffic engineering; accounting; and Illinois Commerce Commission procedure.

Speakers at the final session were: Robert P. Reuss, vice president, general manager, State Area, Illinois Bell Telephone Co., who discussed "Making Community Relations Work For You," and Reginald E. Kepler, marketing and sales manager, General Telephone Co. of Illinois, who discussed "A New Approach To Customer Satisfaction."

The following directors were elected for three-year terms: Robert P. Reuss, vice president, general manager, State Area, Illinois Bell Telephone Co., Springfield; R. W. Britt, vice president, General Telephone Co. of Ill., Bloomington; Russell Logue, vice president, C. T. & N. Telephone Co., Casey; Daniel Schaefer, general manager, DeKalb-Ogle Telephone Co., Sycamore; Roland Schmidt, president, Home Telephone Co., St. Jacob.

F. S. Coakley, general manager, Dixon Home Telephone Co., Dixon, was elected for a two-year term, and the following directors were elected for one-year terms: O. M. Westrup, vice president and secretary, Illinois Consolidated Telephone Co., Mattoon; M. M. Wandrey, division manager, Middle States Telephone Co. of Ill., Des Plaines; Robert M. Wopat, president, General Telephone Co. of Illinois, Bloomington.

At the board of directors' meeting, the following officers were elected: President, Daniel Schaefer, DeKalb-Ogle Telephone Co., Sycamore; Vice President, Don Anderson, Geneseo Telephone Co., Geneseo; Secretary, J. G. Hardy, term expiring Aug. 1, 1960; and Treasurer, Ray J. Alter, Intra State Telephone Co., Galesburg. Ben B. Boynton was appointed general counsel.

The following executive committee was elected: O. M. Westrup, Robert P. Reuss, Ray J. Alter, and Robert M. Wopat.

Effective July 5, 1960, John F. Tharp will replace J. G. Hardy as secretary of the Illinois Telephone Association. Hardy will retire as of Aug. 1, 1960. Tharp is a graduate in law, formerly with the FBI and now with the Illinois State C. of C.

GET ON THE ALTEC LINE—for improved telephone equipment

The best number in your book—the one that connects you with the Altec line. For performance, reliability, and servicing ease, the Altec line of amplifiers and equipment have won a resounding vote of confidence from the industry. Precision-engineered to meet your most exacting specifications. All items available from current stock. Deal directly for greater efficiency with your Altec factory representative!

The 455A Amplifier is a transistorized repeater type amplifier wrapping up a compact package of gain for telephone circuit use. Incorporates the gain, power handling capacity, frequency response, plug-in features in the physical size of vacuum tube type repeater. Ten repeaters go in the same standard rack mount used for vacuum tube types. Operates on 48 volt DC @ 22 ma. Since it is transistorized no 130 volt supply is needed. For details, write for Altec Lansing Bulletin #13385.

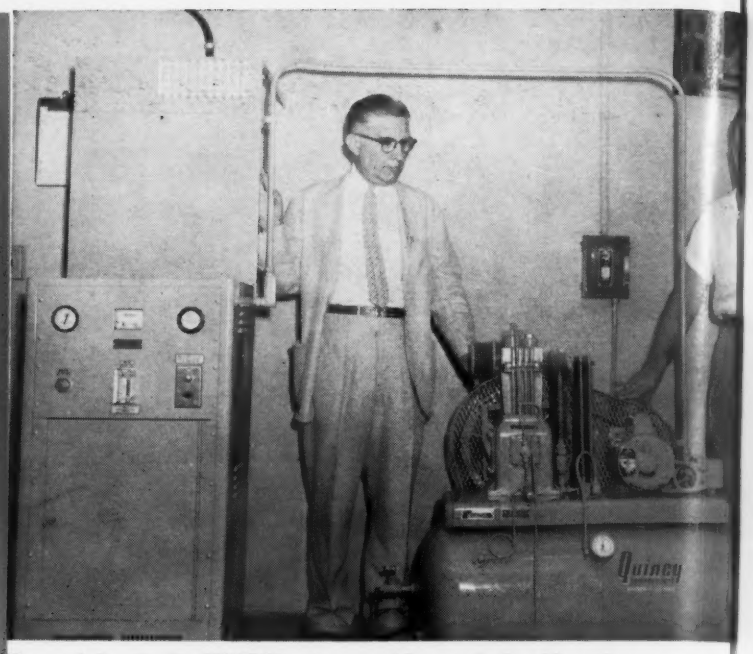
The 529A Power Supply, designed for standard rack mounting, occupies only 3½" of panel space. Operates from 117 volt, 50/60 cycle AC line and delivers 20 volts DC at 3 amps., (0.3 amp at each of ten separate outlets). Maximum ripple content is below 0.002 volts at operating voltage, insuring extremely low noise and high efficiency amplifier operation. Each power outlet is individually fused with a 3/10 amp. fuse. DC voltmeter and rotary selector switch to check each distribution outlet are incorporated on front panel. Variable resistor located on panel front permits adjustment of output voltage to suit load conditions. The 529A can be used with Altec Transistorized Repeaters 477A, 449A, 450A and 453A. Write for Bulletin #13224.

For complete information about Altec telephone and paging equipment write to the address below or call PRospect 4-2900 in Anaheim or ALgonquin 5-3636 in New York.

ALTEC LANSING CORPORATION

ALTEC LANSING CORPORATION, DEPT. TM-7D
1515 S. Manchester Ave., Anaheim, Calif.
161 6th Ave., New York 13, N. Y.
A subsidiary of Ling-Altec Electronics, Inc.

DEHYDRATORS Reduce Trouble Reports For United Tel. Co.



From left, C. P. KIRBY, vice-president of the New Jersey Telephone Co., and ROBERT HOFFMAN, wire chief, Flemington, N. J., inspect a pressurized cable compressor.

A COMPANY which once manufactured power lawnmowers, the S & G Manufacturing Corp., New Orleans, La., is now making quite a name for itself in the telephone maintenance field with an air compressor dehydrator it designed and developed in 1953.

Just how successful these dehydrators are is best demonstrated by actual case reports from operating telephone companies.

In September, 1957, the entire cable plant of The United Telephone Co. of Pennsylvania's Chambersburg, Pa. District was placed under air pressure. The cables in this district comprised a total of over 130 miles, consisting of various sizes and make-up, including exchange cables from 26 pair to 1818 pair and combination quadded toll cables from 12 quad, 19 gauge and 51 pair, 19 gauge to 70 quad and 606 pair.

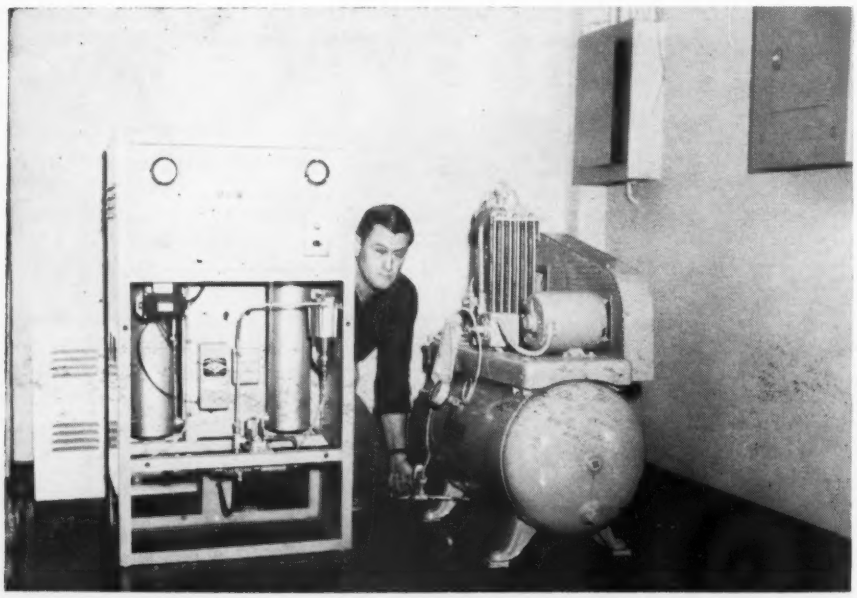
Chambersburg District was picked as an experimental location for various reasons. The plant in this territory consists of several sizes, make-up, lengths and total amount of cables. It also has toll cables to five tributary offices, all of which are dial and are located from five to 10 miles from the main office.

According to J. Howard Federhoof, plant engineer for The United Telephone Co. of Pennsylvania, "Since the completion of this installation we have not experienced a single case of cable failure due to water trouble."

"Interruption of service on toll lines and to our subscribers is our most important concern," Federhoof stated, "and how much interruption this has prevented, we can never begin to estimate."

Federhoof explained that by the use of this air pressure, the company has been able to locate breaks in the sheath, bad joints and bullet holes before they caused any trouble. As a result, the company has been able to keep the plant in A-1 condition. This was done during regular working hours, thereby eliminating men working in bad weather, nights and overtime clearing cable failures.

Based on the experience at Chambersburg, United Telephone of Pennsylvania is now proceeding with plans to purchase more equipment of this



REED CALDWELL, cable splicer for The United Telephone Co. of Pennsylvania, examines pressurized cable compressor.

type and place additional cables under air pressure.

At Flemington, N. J. and several other places in Pennsylvania, the company has an S & G compressor dehydrator to furnish its air supply. The S & G compressor at Flemington is now supplying air for approximately 100 miles of cable. These cables comprise various sizes of exchange and combination quadded toll cables and extend for a radius of from seven to 10 miles from the C. O.

S & G manufactures two types of Air Compressor Dehydrators — the Model A (which is the type in use by United Telephone Co. of Pennsylvania) and the Model RC.

The Model A is exchange equipment designed to supply chemically dry air for telephone cables, aerial and underground, and can supply as many as 50 cables. It is equipped with volume recording air meter, high and low pressure alarm switches, and humistat hour meter. Completely automatic in operation, it has automatic drain and power failure relay and the latest safety features.

The Model RC is also completely automatic in operation. Used for the same purpose of pressurizing aerial and underground telephone cables, this unit is designed for small installations of 80 to 100 miles of cable. It is floor mounted. Operating voltage is 115/220 volts, 1-phase, 60-cycle, and the output is 700 standard cubic feet per day maximum, with a dewpoint of —80°F. and a power consumption of 1.5 amps air compression when running less than 5 amps.

Some of its features include a Hi-Lo pressure switch for alarm, humistat for alarm above 4% R.H., power failure relays and separate fustat and by-pass valve and alarm for excessive R.H. It also has a mechanical control valve for stand-by air supply (O.P.N.) in the event of power failure, additional safety features on the air compressor, a power supply of 115-volt, AC on the dehydrator and air compressor.

In addition to the air compressor dehydrators, S & G also manufactures the Mobile Power Unit (MPU-4-C), a portable power and pumping

YOU ASKED FOR IT!

the NEW DAVIS Self-Propelled T-66 TRENCHER

is built to your specifications

*Pat. Pending

features **Positive Traction...Hydraulic Variable Speed Drive**
Convenient Control...Virtually Effortless Operation

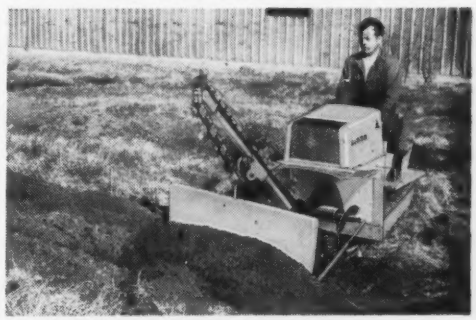
Here's the finest, most advanced utility trencher available. The Davis T-66 has been designed and produced after an exhaustive survey determined the features users really wanted. Every one of its 1350 pounds is packed with performance to handle 9 out of 10 jobs with such efficiency and economy that you're bound to make more profit. And, it's priced far less than you would expect.

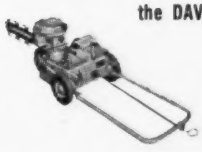
Positive traction, accurate speed control, and distribution of power where you need it is obtained through the use of tracks and a variable speed hydraulic drive. Boom is operated hydraulically for depth control, and it has a built-in pre-loaded shock absorber which cushions the shock but doesn't absorb the power. Everything is designed for the operator's comfort and convenience — requiring very little skill or effort. It digs 3" to 4" wide to 66" deep; or 12" wide, 30" deep and at varying widths and depths in between. Only **two tooth combinations** are required to let you **dig** at all widths. It trenches from 1-ft. to 12-ft. per minute depending upon soil conditions. It is compact, only 37" wide. The Davis T-66 is quality built in every part. It pays off in 33 ways!

ASK ABOUT ITS 90-DAY UNCONDITIONAL GUARANTEE

DOES ITS OWN BACKFILLING

The Davis T-66 has a low-cost, well designed, hydraulically controlled angle backfill blade. The T-66 has two-speed drive with instant forward and reverse, powered steering, independent left and right positive clutches and disc steering brakes for maneuverability in backfilling.





the DAVIS PUP TRENCHER digs by itself

Self-propelled by positive 6-speed winch drive. Digs 2" to 3" wide to 36" deep; 4" wide, 18" deep. Low cost.

the DAVIS HUSTLER UTILITY TRAILER

carries T-66 and numerous other items. 2000 lb. capacity, 48" x 84" deck. Has low center of gravity and load equalization.

DAVIS MFG. INC.

1514 South McLean Blvd., Wichita 13, Kansas

Tell me more about the Davis T-66____ Davis Pup____ Davis Hustler Utility Trailer____
Please send literature and name of distributor.

NAME_____

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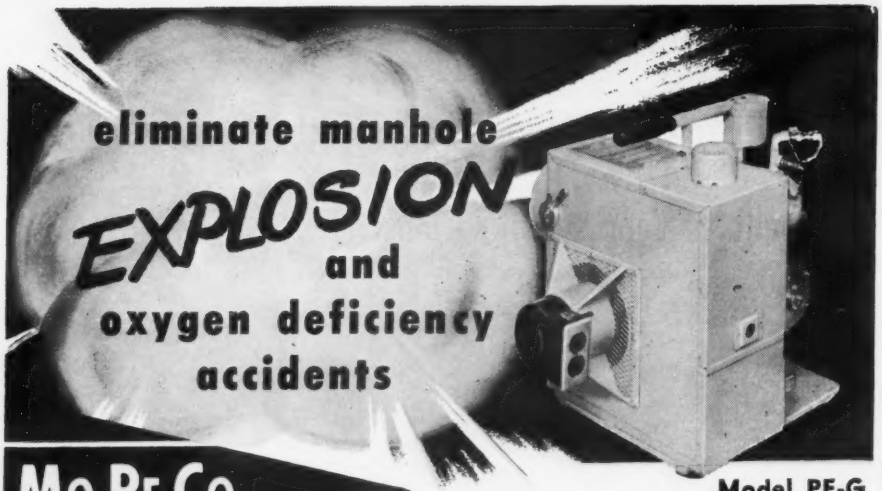
TOWN_____ STATE_____

T6-60-3



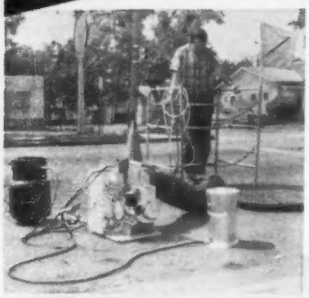
MO PE CO

Model PE-G

VENTILATING HEATERS

give you fresh air • heated fresh air • light

...in one portable unit!



- 300 to 600 cfm fresh air
- 10° to 96° temperature rise
- 300 watt DC generator
- Weighs only 78 pounds
- Propane or Butane fuel
- Safe fresh air blown into the manhole at all times.

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MORRISON-PELSUE CO.

Denver, Colorado

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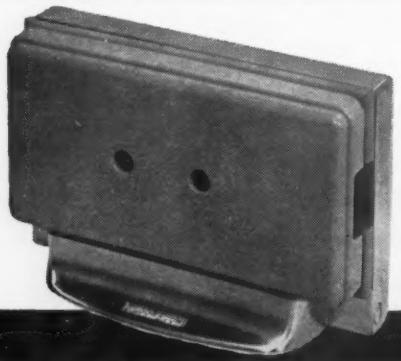
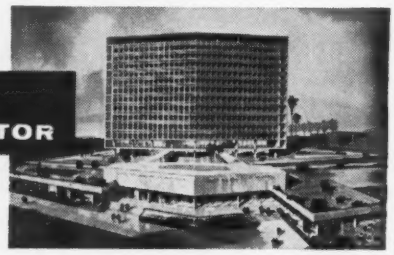
Order through your favorite distributor



FLOOR-CON

... outmodes all other methods of telephone installation

Model No. 104 — shown with standard telephone equipment — accommodates up to 8 No. 44-A Western Electric connecting blocks (4 on each side). Model No. 102 takes up to 6 (3 on each side), or if desired, the back of the Floor-Con can be used for external ringers, buzzers, or auxiliary equipment. This allows the desks and furniture to be free from all telephone equipment.

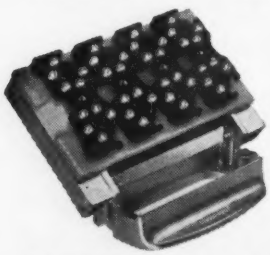


TELEPHONE FLOOR CONNECTOR

BEAUTY — clean lines and modern design

UNIFORMITY — provides standardized connections throughout

ECONOMY — phones can be completely installed prior to building occupancy



The fabulous FLOOR-CON allows phones to be connected entirely independent of office furnishings. Furniture may be moved or replaced without incurring expensive telephone changes. Gone are the clutter of equipment from desks and walls, and the needless marring of furniture.

Approved and specified by telephone companies, FLOOR-CON is used exclusively in many large buildings in business, industry and government. Attaches to all types of underfloor ducts and floor boxes, or fastens directly to the floor. Comes in four plated finishes to match the decor of the office.

FLOOR-CON — simplifies telephone connection service.

PAT. NO. 2854166

For catalog information and prices, write —

FLOOR-CON 759-761 NORTH SPRING STREET • LOS ANGELES 12, CALIF.
Telephone: MAdison 4-5400

plant it developed in 1950 when the company first entered the telephone maintenance field, and a line of accessories including an air rate indicator panel, flowmeter units and air flow indicator.

The United Telephone Co. of Pennsylvania has purchased several of these accessories, including the flow meter panels and others.

S & G Manufacturing Corp. is the manufacturing division of the Wm. F. Surgi Equipment Corp., a New Orleans machinery equipment firm founded over 30 years ago. The name, S & G, is derived from that of the owners and founders of Surgi — Bill Surgi and Charles Green. Roy J. Surgi is vice president and heads all design and manufacturing operations for S & G.

In 1949, S & G was asked to develop a portable power and pumping unit for one of the large Bell companies. In 1950, after building a prototype unit which was approved by Bell engineers, the company was awarded a contract to build a quantity of S & G Mobile Power Units. The units have been made since then and hundreds are operating in the field.

In 1953, S & G designed and developed the air compressor dehydrator for the continuous feed pressure system, and now builds these units by the hundreds for Bell companies, U. S. Government communications installations and many Independent telephone companies in and out of the United States.

S & G is equipped to develop and test many types of units in the communications field. In addition to manufacturing and sales, S & G offers its services in problems with outside plant construction and the continuous feed pressure system.

New Products' Showcase

SUPPLIES AND EQUIPMENT

By DICK REYNOLDS

Two-Way Radio

A NEW 100-watt vehicular communications unit has been announced by General Electric Communication Products Department.

The 100-watt mobile will be available in low band frequencies, 25 to 50 mc, and packaged in a case four inches high, 8 5/8 inches wide and 15 inches long. The small size permits the complete unit to be mounted under the dash in most cars and trucks. However, the unit is designed in two sections to facilitate mounting in trunks, under seats, and in various other parts of the vehicle.

The unit draws 1.75 amperes when "on" and ready to transmit. Standby drain (ready to receive a message) is 40 milliamperes using a 2-watt speaker. This enables a driver to turn his vehicle's engine off and still hear his radio without installing special equipment to eliminate battery problems.

With the announcement of the 100-watt unit, G-E also disclosed that it will make available 30-watt equipment in low band, between 25 and 50 mc. *Check NP* 475.

100-Watt Vehicular Communications Unit from General Electric Co.

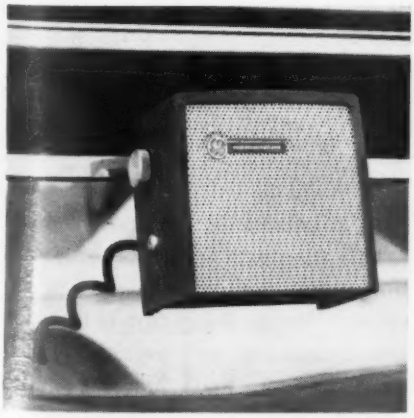
10-Watt Speaker

GENERAL Electric Company has also introduced a 10-watt speaker for use with its Transistorized Progress Line two-way radio equipment.

The new equipment weighs three pounds and eight ounces. It is easily detachable from mounting brackets at the dash of a car and may be hung on the car's window so messages may be heard by a driver who is outside the vehicle.

The speaker provides higher sound level for applications where prevailing noise conditions over-ride the standard speaker's output. It is particularly useful where the vehicle operator is required to be some distance from his vehicle periodically.

On "standby" (no messages being received but ready to receive a call) the 10-watt design requires only .090 amperes. *Check NP* 476.



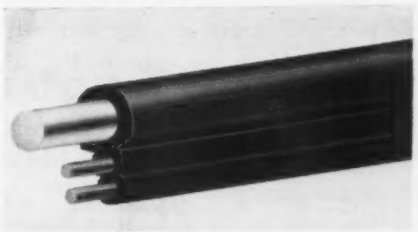
10-Watt Speaker from General Electric Co.

Supported Drop Wire

A NEW drop wire, recently introduced by Superior Cable Corporation, features the messenger as an integral part of the jacket. Designated as Supported Drop Wire, type I.M. 2-22, the wire contains an extra-strong messenger.

The wire consists of 2-22 gauge soft copper conductors and a 16 B. W. G. high strength galvanized steel support wire laid parallel with an integral insulation and jacket overall.

The insulation-jacket is of weather-resistant polyvinyl chloride and is



designed so that the conductors may be separated from the support wire, and the conductors separated from each other, with each retaining its insulation respectively. *NP* 477.

Exchange Type Cable

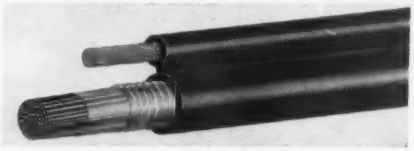
NEWLY ANNOUNCED from Superior Cable Corporation is supported exchange type cable designed to eliminate the need of spinning or supporting cable to a messenger which has previously been installed.

The cable can be installed in one operation inasmuch as the messenger is an integral part of the cable jacket, yet is available for support, gripping, pulling and tensioning.

The cable is available with standard core construction of the Superior

TEL-U or TEL-CU type or exchange type constructions with insulated conductors and longitudinally applied, corrugated aluminum or copper shielding. Other types of communication and control cable construction can also be provided with an integrated messenger.

The messenger, a 7/32″ stranded 1 x 19 with 6300 pounds breaking strength, is jacketed as an integral



part of the cable with weather-resistant polyethylene. Sizes from 6 to 100 pairs with 24, 22 or 19 gauge soft copper conductors. *Check NP* 478.

Turret Derrick

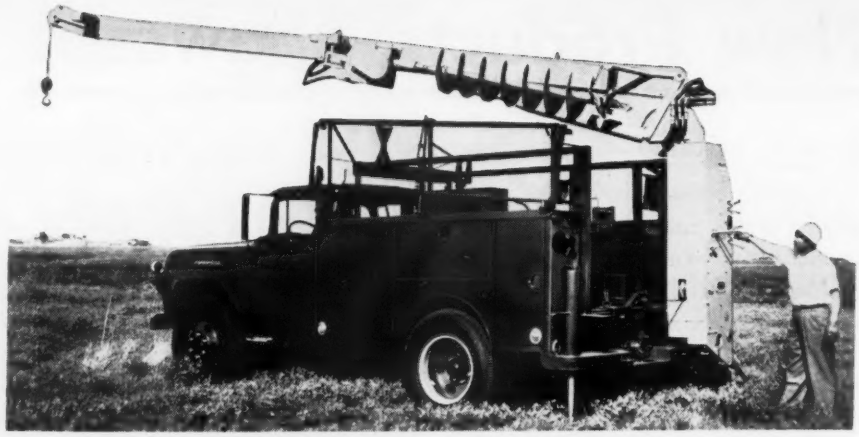
A NEW universal turret derrick unit with full 360° rotation, three mounting positions for line bodies and optional equipment including hydraulic digger and fibreglass one-man basket has been announced by Truck Equipment Co.

Known as Model 8-TTD-30-U, the derrick will mount at right rear, left rear or behind the cab in 16″ of space. All controls are unitized into the base, giving the operator full visibility and fast response of controls from one location.

Box type heavy duty steel booms telescope in two sections to give a 21½ foot extended working radius through a 360° arc range. Maximum capacity is rated safely at 8,000 pounds. Stability is achieved through hydraulic outriggers and jacks.

The operator may stow and unstow the auger automatically and use the digger with either boom section. This makes possible maximum radius for digging holes, yet enables operator to stow the digger with the main boom section while lifting and setting large utility poles with no danger to derrick, pole, digger or personnel. Derrick has 30 foot sheave height.

Optional equipment includes a four speed digger, 8,000 pound capacity winch, fibreglass one-man aerial basket or 500 pound capacity two man basket. *Check NP* 479.



Universal Turret Derrick from Truck Equipment Co.

UHF Power Amplifiers

TWO NEW UHF Power Amplifiers, the 240F-2A, and the 240F-2B, have been introduced by the Texas Division of Collins Radio Company.

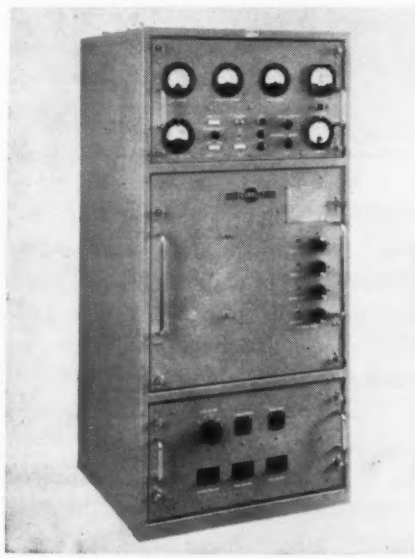
Both the 240F-2A, utilized for transportable scatter communication, and the 240F-2B, designed for fixed station scatter operation, deliver 1 kw output power and operate in the 1700-2400 mc range.

The 240F-2A, which weighs 350 pounds, occupies a floor space of only 24 by 24 inches and stands 51 inches high. The 240F-2B weighs 580 pounds and is 24 by 24 by 64 inches. Primary power requirement for the 240F-2A is 208 volts AC, 3 phase-four wire, 380-420 cps. For the 240F-2B, it is 208 volts AC, 3 phase-four wire, 47-63 cps.

In both amplifiers, a four-cavity, air-cooled, permanent magnet klystron is used to provide a minimum power gain of 55 db synchronously tuned and 40 db when tuned for maximum efficiency. The synchronously tuned condition provides a bandwidth of approximately 2.5 mc. When tuned for maximum efficiency, a bandwidth of approximately 12 mc is obtained.

240F-2B UHF Power Amplifier.

The power supply, klystron cabinet, and the control and meter panel are modular units in both amplifiers and can be readily removed for maintenance or replacement. *Check NP* 480.



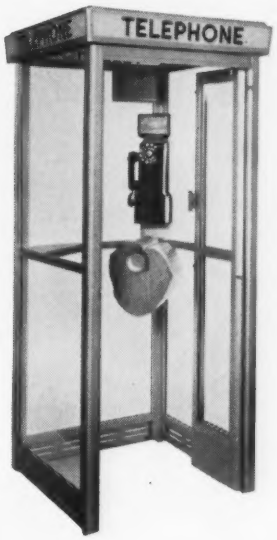
240F-2A UHF Power Amplifier.

New Brushking

ROWCO MANUFACTURING Co. has introduced a new model of its Brushking portable power brushcutting machine with a 50% power increase. Designated as Model 660, the new Brushking unit provides 3 HP throughout, with no increase in the size or weight of the machine.

The added power gives the Model

PROVED
BEST for attractive appearance



Intelligent engineering always includes appearance. Slim posts, good proportions and a variety of glass and solid panel arrangements make this the most attractive booth available.

the BN Booth

For full particulars, consult your distributor or write direct ...
Benner-Nawman, Inc., 3421 Hollis Street, Oakland 8, California.

a B-N booth is a busy booth!

STOP LIGHTNING AND POWER SURGE DAMAGE
WITH BUDELMAN GAS FILLED TUBE PROTECTORS

Gas-filled tubes discharge high voltages faster than carbon blocks — ten times faster than air gaps — and discharge both sides of the pair at the same instant.

TYPE 167-B For Carrier Terminals

Panel type. Two 300-500 volt, plug-in tubes; two 6-amp, auto-reset circuit breakers. Each tube discharges its respective line (power or telephone). Circuit breakers also serve power line and prevent follow-up arcs from normal current.

TYPE 167X1
For Telephone Lines

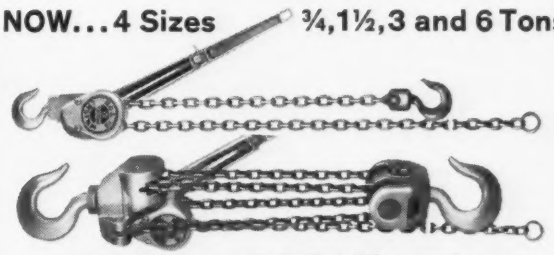
Single-tube, single-pair protector. Plug-in type, 300-500 volt tube. Bracket mounting, snap-on weather-proof cover. For carrier lines and drop side of subscriber carrier terminals.

Write or call us for Bulletin 259-C

BUCKEYE TELEPHONE & SUPPLY CO.
1250 Kinnear Rd. • Columbus 21, Ohio
Phone—HUdson 8-0655 (Area Code 614)

New ¾-ton Type "C" Pull-A-Way

NOW... 4 Sizes ¾,1½,3 and 6 Tons



WRIGHT Type "C" Pull-A-Ways make easy work of hundreds of quick hook-up jobs. Now available in four sizes—¾, 1½, 3 and 6-ton—Type "C" Pull-A-Ways are portable, safe and rugged. Corrosion-resistant modern aluminum alloy castings are used for gear case, handle and covers of all models. Hooks, load chain and chain sheave are made of alloy steel. Positive, dependable load brake securely holds load at any point. Lubricated for life. Weights: ¾-ton, 12½ lbs; 1½-ton, 23½ lbs; 3-ton, 36½ lbs; 6-ton, 63 lbs.

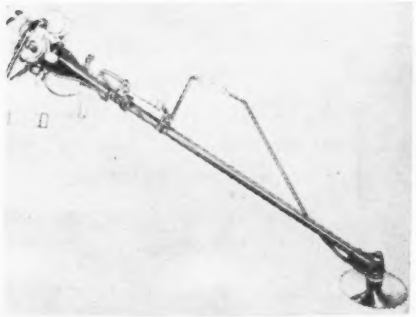
Write to our York, Pa., office for Bulletin DH-56

WRIGHT HOISTS

Wright Hoist Division • American Chain & Cable Company, Inc. ACCO

York, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

660 up to 50% higher cutting capacity by eliminating any tendency of the blade to bind even when cutting through dense and heavy brush or

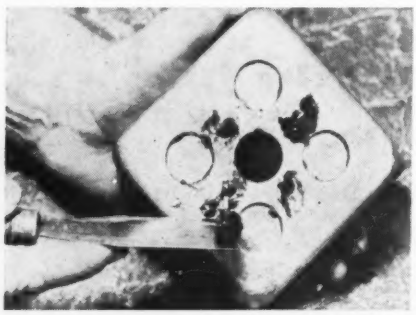


trees up to 9" in diameter. Anti-friction needle and ball bearings, plus special magnesium and aluminum fittings throughout, minimize vibration in the new unit. *Check NP* 481.

Plastic Steel

MOUNTING junction boxes without drilling, without screws, and without nails is now possible through the use of Plastic Steel from Devcon Corp.

A combination of 80% steel and 20% extra strength epoxy plastic, this material will bond junction boxes



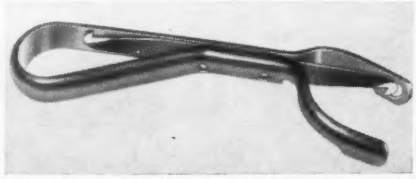
and other fixtures to steel beams or machinery, wood, cinder block, brick, and concrete permanently.

No heat or pressure is required. Just mix the plastic steel and hardening agent and apply to the back of the box. The box is then positioned against the wall and supported until the plastic steel has hardened. In about one hour the box can be wired in the usual way. One pound of plastic steel is sufficient to attach 50 junction boxes (4 x 4) to a concrete wall. *Check NP* 482.

Slitter For Cable Sheath

P. K. NEUSES, Inc. has announced a new Cable Sheath Stripper called No. N-62267 for most types of cable jackets.

The sharp hook slitter lets you cut into cable at any point without pre-



viously notching (hazardous to wire inside, and your hands) through sheathing.

An extra blade is included and blades are easily changed. The 2 screws that hold blade in cutting position also secure the extra blade with its cutting end protected until put into position for use. *Check NP* 483.

Portable Test Instrument

MATERIALS such as metal, plastics, textiles, wire, springs, leather, etc., can be tested with the new Dillon Model M tester. Changes in grips

adapt the basic instrument for tests of tensile, compression, transverse and shear forces.

Operation of the unit is by means of a calibrated pendulum, one of the most accurate of all measuring devices. All testers are guaranteed accurate within ½ of 1% of indicated reading in accordance with A.S.T.M. requirements.

Calibration is available in a choice of ounces, tenths of pounds or kilos. Permanent stress-strain curves are also possible with the unique Dillon rotating drum recording system as an accessory. *Check NP* 484.

Tape Winder

A NEW low cost tape winder has been introduced by Comptometer's Western Apparatus Division. The new tape winder is lightweight, mounts on teletypewriter equipment, and converts to a portable unit, if desired.

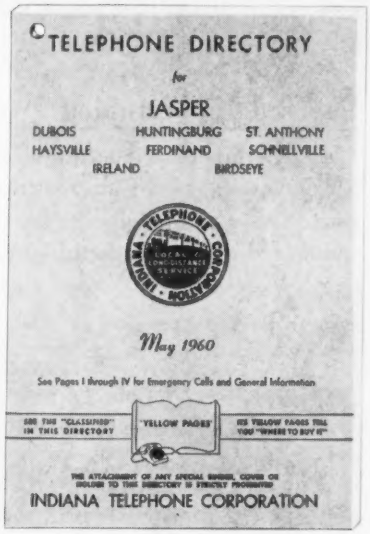
Equipped with a 12-inch metallic reel, the tape winder holds up to

1,300 feet of chadless and up to 2,000 feet of fully perforated tape. Winding tension is adjustable to obtain maximum tightness without tearing the tape.

The reel is magnetically held to the rotating frame for simple, snap-off removal; no screws, bolts, or nuts are involved. Tape is removed by a simple rotation of the two sides of the reel. Reel posts are changeable to handle different widths or levels of tape.

The tape winding operation is protected by a standard built in safety device. When the run of tape being wound becomes taut, it opens a Mercury switch, cutting off motor power. When the tape becomes slack the switch closes again to begin winding the tape.

Sets of parts are available to mount the winder on Teletype 28 Type Consoles, on Teletype 19 Type sets, on Teletypesetters Reperforator Tables, or it can be converted for use as a portable unit. *Check NP* 485.



A Directory for the
Indiana Telephone Corporation

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PROVIDES MANY YEARS
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One of the handiest, most dependable "tools" in any cableman's kit. Stainless steel construction defies rough treatment and makes these precision units practically indestructible. Outlast glass thermometers many times over. Range is 200 to 1000° Fah. Dial diameter is 2¼". Stem length is 7¾". Furnished with handle. Decide today to eliminate porous cable joints. Accurate Dillon Temperometers cost very little yet offer real insurance against this hazard. Dial shows recommended temperature for wiping solder, paraffin, impregnation waxes, etc.

Satisfied owners in the telephone and utility fields specify Dillon Temperometers as standard equipment. Shipment is from stock at the factory or orders may be placed with leading jobbers. Illustrated bulletin upon request. No obligation!

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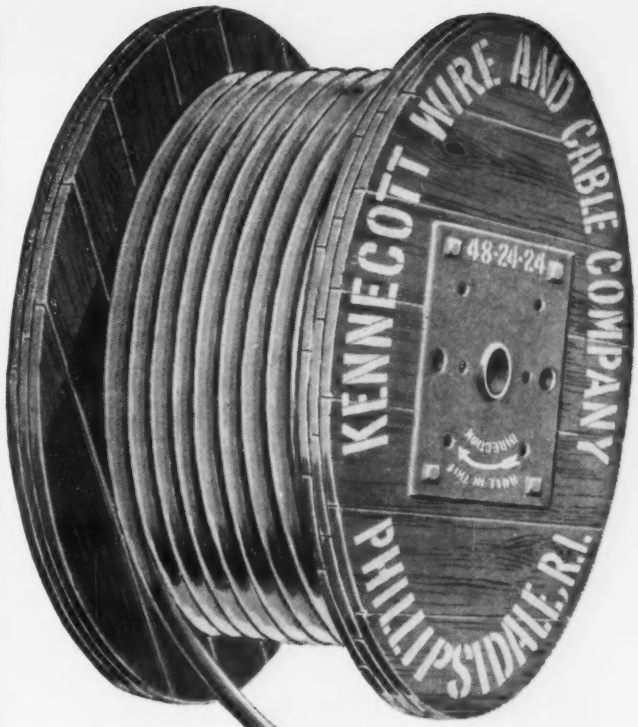

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when the heat's on!

Despite temperature extremes, you can depend on Kennecott lead-alloy sheathed cable to give perfect service! Its exclusive "Young Process" lead sheath and precision-wound tape insulation shrugs off heat damage that would greatly shorten the life of other types of insulation and sheathing. Proof of this is that Kennecott Telephone Cable lines have been giving superior service since 1897.

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Wilkes-Barre, Pa.

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NATCO CORPORATION

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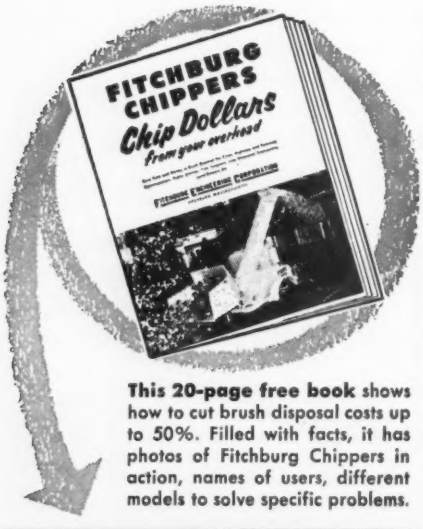
HOW TO SAVE MAN HOURS IN BRUSH DISPOSAL



This 20-page free book shows how to cut brush disposal costs up to 50%. Filled with facts, it has photos of Fitchburg Chippers in action, names of users, different models to solve specific problems.

Mail coupon for your copy today!

FITCHBURG ENGINEERING CORPORATION
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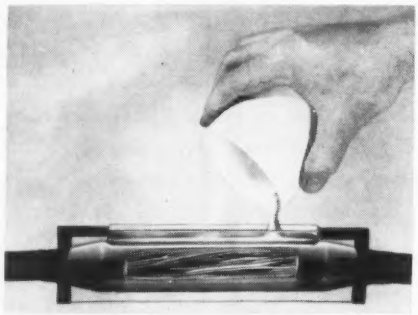
Cable Splice Compound

C & S PRODUCTS Company has announced the introduction of Semper-Seal, a new epoxy-type resin for use in splicing and plugging signal, communication, and electrical power cables.

Semper-Seal is a clear, two-part compound that is weather-tight and has transparent clarity for cable encapsulation. It is a two-part compound consisting of a resin and hardener which when mixed together create a thermosetting action. The compound through its own chemical change will, in 30-45 minutes, become a solid, clear, air-tight seal. The heat index during the curing

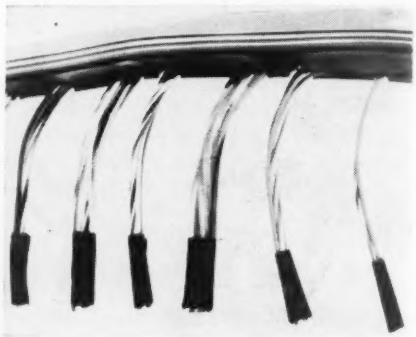


process is very low and will not cause any deformation or disfiguration of polyethylene insulated conductors. Its low viscosity enables it to completely encapsulate all conductor interstices effecting a solid block, yet not running back more than 1" to 2" beyond the sheath opening. The quick setting action permits pouring of the cable block in a horizontal position without excessive run-back into the cable core.

Semper-Seal is furnished in kit form consisting of two separate bottles of resin and hardener, a clear butyrate plastic mold, a paper mixing container and a mixing paddle. Kits are available in 2 oz., 4 oz., 10 oz., and 20 oz., sizes. *Check NP* 486.

Tapered Zippertubing

A NEW tapered Zippertubing cable jacket for cables of decreasing diameters due to branch-outs has been announced by The Zippertubing Company. Wires can be pulled through



perforations of the tapered Zippertubing to permit attachment to termination points. One man can apply tapered Zippertubing; no special tools are required.

Tapered Zippertubing can be ordered in colors matching all types of cable jackets. *Check NP* 487.

Stepping Switch

A NEW 10-point stepping switch, the Clare Type 210, designed for digital operation, has been announced by C. P. Clare & Co. The switch is small (maximum length 4 5/16"), lightweight (1½ lbs. with 12 levels) and capable of over 100,000,000 operations with twelve ten-point levels; 300,000,000 with four four-point levels (properly lubricated and adjusted). *Check NP* 488.

NEW PRODUCTS' DEPARTMENT **7-15-60**
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NP 485..... NP 486..... NP 487..... NP 488.....

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J. G. Hardy Retires As Illinois Secretary: John F. Tharp Named To Post

JOHN F. THARP of Chicago has been elected secretary of the Illinois Telephone Association to succeed J. G. Hardy, who will retire from that position August 1.

Hardy has served the Illinois Association as secretary for 16 years. During this period, he has also been active in nationwide telephone industry affairs, working closely with the officers and committees of the United States Independent Telephone Association. He has been particularly active in rendering assistance to the smaller Illinois Independent companies in all phases of their operation.

Hardy has had long experience in the telephone industry. He entered the employ of the Murphysboro Telephone Co. in August, 1913. He held various positions with that company, including groundman, lineman, wire chief and manager at Murphysboro until June, 1917, when he entered the United States Navy as an electrician.

He was honorably discharged from the Navy in June, 1919, and returned to Murphysboro as manager. In June, 1928, he became district manager of the Illinois Southern Telephone Co., successor of the Murphysboro Telephone Co. He was advanced to commercial superintendent of the Illinois Commercial Telephone Co., successor of the Illinois Southern Telephone Co. in April, 1931, with headquarters at Springfield, Ill. He served in that capacity until his election as secretary of the Illinois Telephone Association on August 1, 1944.

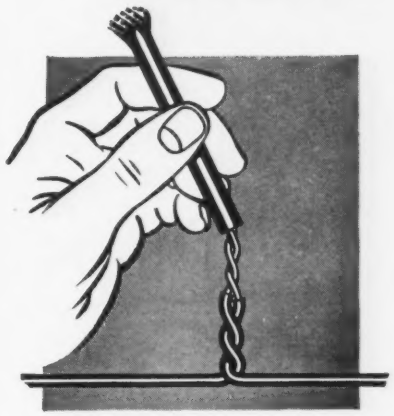
Tharp, at the time of his election as secretary, was manager of the Labor Relations Department of the Illinois State Chamber of Commerce. He was appointed to that position on April 1, 1957. In that capacity, he has worked with the Chamber's Labor Relations Committee on a wide variety of problems in the labor-management field. The committee concerns itself with labor — management relations problems, including national and state legislative issues.

Tharp, who is 35, came to the state-wide business organization from Montgomery Ward in Chicago, where he was a labor relations attorney, specializing in union negotiations. His work with the mail order house necessitated a heavy travel schedule and a continuous series of labor negotiations. Other responsibilities there included the handling of National Labor Relations Board elections, as well as other matters pertaining to labor relations and labor law. Tharp also served for four years (1951-1955) as a special agent of the Fed-

JOHN F. THARP

J. G. HARDY

Superior's "Super-Splice"® is safe and sure!



"Super-Splice" makes splices waterproof . . . from inside out!

Sealed at one end, this plastic splice sleeve is filled with an insulating and waterproofing compound.*

Economical "Super-Splice," a Superior exclusive, makes the splice permanently as good as the cable . . . yet it can be re-entered easily. The compound never hardens or oozes out no matter what the temperature.

Prevent leakage currents and breakdowns in the presence of moisture... good for 25,000 v.d.c. Order "Super-Splice" NOW!

*A Dow-Corning silicone compound.

An REA Standard.

"Super-Splice" is available for use with straight, butt or bridge splices.

For further information on economical "SUPER-SPLICE", write

SUPERIOR CABLE

SUPERIOR CABLE CORPORATION
Hickory, North Carolina

GOING UNDERGROUND?

weigh these advantages of owning your own Parsons 77 Trenchliner

As you get into more and more underground installations, you'll be faced with the question: Should I hire a contractor for my trenching work, or use my own equipment and crew? To answer this you'll want to analyze: (1) how readily contractor services are available, (2) contractor price-levels in your area, and (3) amount of cable you expect to lay.

In weighing these factors, don't overlook the advantages of owning your own Parsons 77 Trenchliner . . . having it on call whenever you need it . . . and at closely-predictable installation costs. The bantam-size 77 opens trench at up to 21 lineal feet per minute — 6 to 18 inches wide — at depths to 5 feet. As in photo above, Parsons 77 can easily be adapted to combine trenching and cable stringing in a single operation.

Learn more about it — send coupon, or see your Parsons distributor.

Here's another Parsons® Trenchliner worth considering. Wheel-type Model 130 digs 12 to 20 inches wide, up to 5 feet 9 inches deep . . . turns in its own length. Single controls handle grading and hoisting of digging wheel.

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Send bulletin on ☐ 77 Trenchliner ☐ 130 Trenchliner®

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eral Bureau of Investigation in the investigative agency's Chicago and Los Angeles offices.

He was born in New Albany, Ind., graduated from high school at Palmyra, Ind., served in the U. S. Marine Corps from 1943 to 1946 and was graduated in 1951 from the Chase College of Law in Cincinnati with an LLB degree. After graduation, he successfully completed the Ohio bar examination and was admitted to the bar of that state in March of 1951.

Budelman Electronics Appoints New Distributors

EMPIRE Telectronics, 5708 Balsam St., Arvada, Colorado, has been appointed a distributor for Budelman Electronics Corp. of Stamford, Conn., manufacturer of telephone carrier, voice frequency telephone repeater and UHF and microwave point-to-point multiplex radio equipment. Empire will handle Budelman products in Colorado and Utah.

Space Com, Inc., 2321 Fourth St., Santa Rosa, Calif., will handle Budelman products in California, Oregon, Washington and Arizona.

Maritime T & T Seeks Offers For PTM Microwave System

THE MARITIME Telegraph & Telephone Co., Ltd., Halifax, Nova Scotia, Canada, has had to replace its PTM Microwave Radio System with a much larger one because of the great increase in traffic. This Pulse Time Modulation system is therefore being offered for sale, and offers are invited by General Manager A. Gordon Archibald.

It is a six-hop system, and was manufactured and installed by Federal Electric Manufacturing Co., Ltd. (FEMCO) of Montreal, Canada, a member of the I. T. & T. group. This company has since been succeeded by Standard Telephone & Cables (Canada) Ltd. of Montreal. The equipment operates in the 2,000 megacycle band.

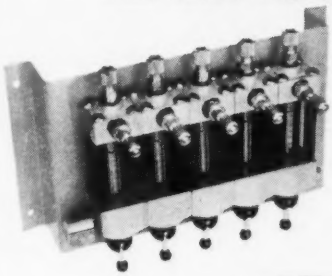
The system consists of three separate R.F. paths, each on a separate antenna system. Two paths are equipped with 23 channels of multiplex and the third is used as a protection path

be prepared

S&G

Accessory Equipment for Continuous Feed Pressure Systems

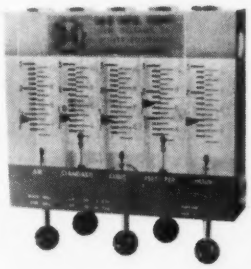
AIR RATE INDICATOR PANEL



PART NO. 8174

Furnished for 5 or 10 cables. Other Panel sizes are available.

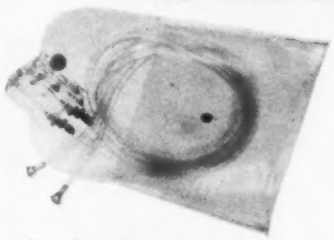
FLOWMETER UNITS



PART NO. 8001-C

5 cable unit or 10 cable unit. Panel mounting available.

AIR FLOW INDICATOR



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Used in locating leaks in telephone cables under Air Pressure.

Many other accessories and plastic air supply lines are available for pressurizing systems.

order through your favorite distributor

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Amertel 195 has superior voice transmission efficiency

People who have trouble hearing over rural lines are surprised at the difference when a new USS Tiger Brand Amertel 195 line goes in. The electrical resistance per mile is only 38.8 ohms—the lowest of any high strength steel wire.

And there's a big saving in line cost, too, for Amertel 195 can be used in spans of 600, 650 and 700 feet, depending on loading conditions. This means fewer poles, faster construction, and less maintenance.

Ice hazards are greatly reduced, too, because Amertel 195 can take greater loads without breaking and come back closer to its original position.

Why not write for the complete story. It's all in our booklet, "Amertel 195." American Steel & Wire, Dept. 0274, 614 Superior Ave., N. W., Cleveland 13, Ohio.

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Tennessee Coal & Iron Division, Fairfield, Ala.
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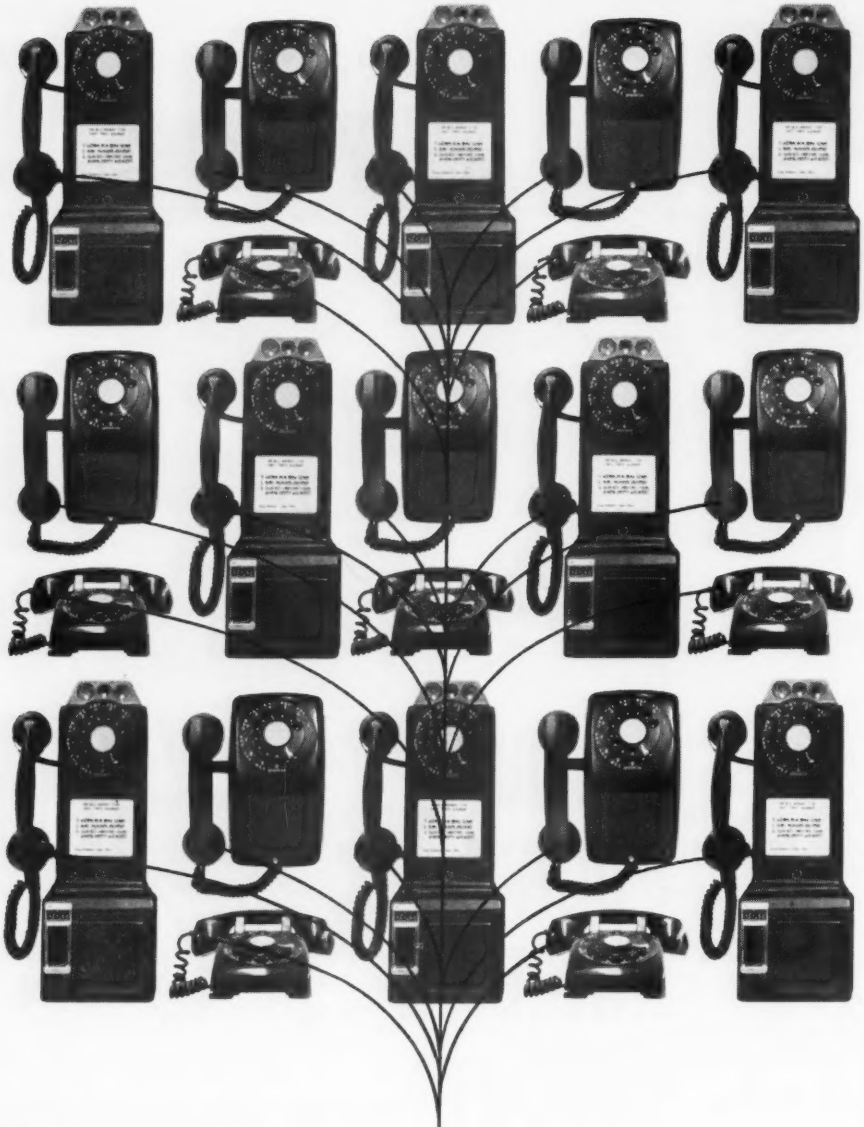
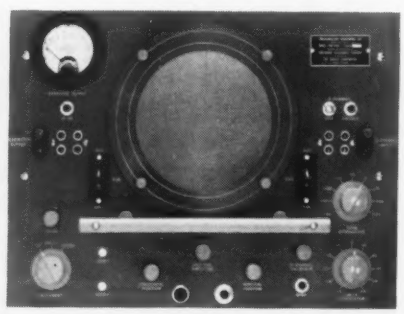


BUILD YOUR PROFIT POTENTIAL

Reduce Testing Time and Make Optimum Use of High-Cost, Experienced Personnel

You can meet the challenge of modern, ever increasing service demands; the far more stringent test requirements resulting from D.D.D.; by application of the new Hallamore designed and manufactured Swept Band Transmission Test Set. This unique instrument affords fast, completely accurate transmission measurement (including repeater or amplifier gain, determination of return losses, and location of loading faults). Readings are in visual form, easily photographed to provide a permanent record.

Range is from 200cps to 4000cps. Unit may be rack mounted or may be used for greater mobility on a Hallamore test wagon. Accessories include a Hybrid Test Set, Camera Attachment, and Artificial Lines. For detailed information, please write Hallamore, Telephone Department, 714 No. Brookhurst St., Anaheim, California. PRospect 4-1010, D.D.D. area 714.



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HALLAMORE

Repeaters/Test Equipment/Repair, Rebuild, Color Subscriber's Apparatus/Closed Circuit TV

which is manually switched at each end in the event of a failure of either of the working paths.

Two R.F. channels and one multiplex system were installed in 1950, and the second multiplex and third R.F. path in 1952.

The longest repeater section is a 50 mile over-water hop. Triple space diversity was used in this section with very good reliability.

One channel on each multiplex system is equipped with "drop and insert" equipment at each repeater to permit the maintenance staff access to the system on a voice frequency basis, if required.

A comprehensive alarm system with a capacity for displaying at the terminals up to 18 alarm conditions from each repeater is part of this system. The alarm system utilizes telegraph tones and stepping switches and requires a separate facility linking all the repeaters and the terminals.

This PTM system has given reliable commercial quality service since it was installed and is being replaced by a system of much greater capacity operating in the same frequency band.

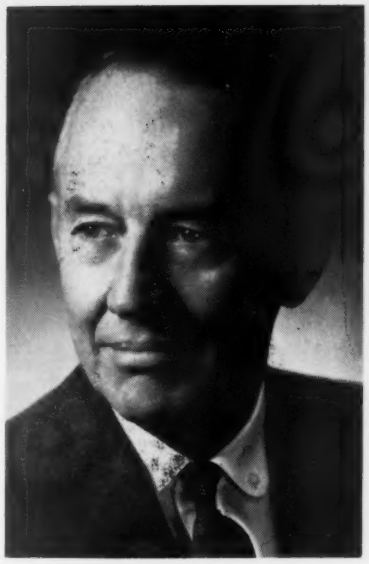
Stromberg-Carlson Names Sears, West Coast Mgr.

EDGAR R. SEARS, Sr., has been advanced to the position of manager of the West Coast Branch of Stromberg-Carlson's Telecommunication Division, according to an announcement by T. C. Thompson, general manager of commercial sales of the division. Stromberg-Carlson is a division of General Dynamics Corp.

In this position Sears will succeed Joseph P. Galligan, who will continue to serve in the West Coast branch office as a sales consultant.

"The dynamic growth of this section of the country and the potential for further development make it imperative that a smooth transition in managerial responsibilities be effected prior to Mr. Galligan's retirement," Mr. Thompson said.

Sears is well known in telephone circles in the West and Midwest. From 1941 to 1955 he was Pacific Coast manager for the Kellogg



EDGAR R. SEARS

Switchboard & Supply Co. Previously he had been a field sales engineer and manager of switchboard sales for the same firm. His telephone career, covering more than 40 years, started with a job as repairman-installer for the Southwestern Bell Telephone Co. in Hutchinson, Kansas.

In 1922 Sears accepted a position with the United Telephone Co. of Kansas as plant chief for the Hays and McPherson offices, and a few years later he became equipment engineer at the Abilene headquarters of the United system. He joined Stromberg-Carlson in 1955 to head the Telecommunication Division's newly-created industrial sales department. During this period he has been

JOSEPH P. GALLIGAN

in close touch with West Coast operations through the considerable industrial sales activity that has developed in that area.

Galligan's many years of experi-

DESIGNED FOR THE TELEPHONE INDUSTRY'S SEALING, SPLICING AND INSULATING NEEDS

3

BISHOP

TAPES

- rapid build-up of voids
- outstanding electrical protection
- maximum abrasion protection
- permanent moisture sealing

1 **NO. 125 ELECTRICAL FILLER TAPE**

Fills voids in splice bundle in a matter of seconds . . . provides foundation for subsequent tape layers . . . a ⅛-inch thick insulating compound in tape form that can be molded by hand to comfirm to irregular shapes and contours.

2 **BI-SEAL SELF-BONDING** (polyethylene based) **ELECTRICAL TAPE**

Is the strong moisture barrier. Layers fuse so tightly it's impossible to delaminate them. Excellent chemical, mechanical and thermal properties. Bi-Seal has no right or wrong side; will not stick or tangle during application; workable to −40°C.

3 **BISHOP VINYL ELECTRICAL TAPE**

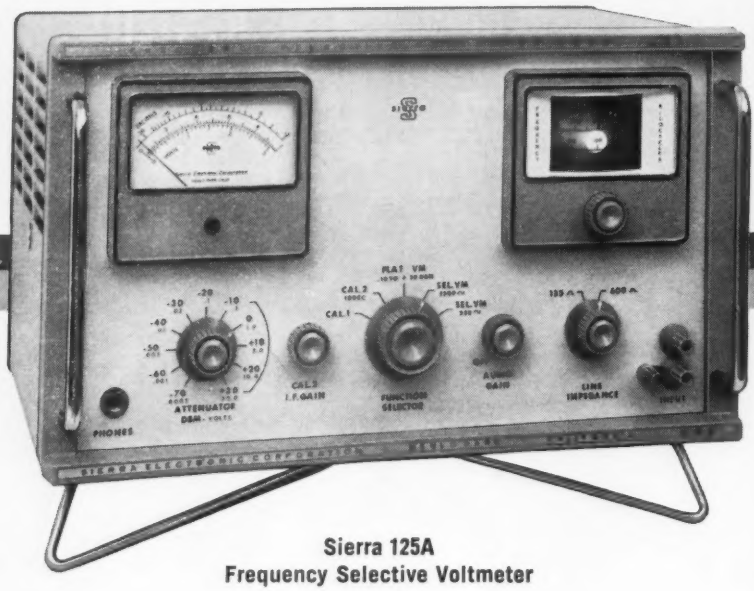
No. 1 (7-mil) and No. 2 (10-mil) is used for final abrasion-resistant covering. A thin, tough, resilient, pressure-sensitive tape with great adhesive strength. Also popular as an all-purpose tape for general splicing jobs.

SOLD ONLY BY LOCAL AND NATIONAL TELEPHONE SUPPLY DISTRIBUTORS

MORE THAN A CENTURY OF BISHOP ELECTRICAL INSULATION

BISHOP MANUFACTURING CORPORATION
11 CANFIELD ROAD
CEDAR GROVE (ESSEX CO.) N. J.

New Tunable Voltmeter is also flat AC VTVM covering 1 to 600 KC



Sierra 125A
Frequency Selective Voltmeter

As a frequency selective voltmeter, Sierra 125A covers 3 to 600 KC continuously on a 40" scale. An up-converter with high IF and single conversion keeps spurious responses down 60 db. Crystal lattices provide two steep-skirted IF bandwidths — 250 cps or 2.5 KC.

As an AC VTVM, Model 125A offers response flat within ± 0.2 db, 1 KC to 600 KC, and measurement accuracy of better than ± 0.5 db. This additional mode increases the instrument's versatility and facilitates measurements on carrier systems.

Measurement range is —90 to +32 dbm in selective mode and —30 to +32 dbm in the flat mode. Signal levels are read directly on either 135 or 600 ohm lines, balanced or unbalanced. Line bridging loss is less than 0.25 db over the entire frequency range. Built-in 100 KC crystal oscillator provides accurate reference for both level and frequency calibration. Modular construction and etched epoxy glass circuit boards provide ease of access and operating dependability.

Price, $895.00 f.o.b. factory.

For complete details, see your Sierra representative or write direct.

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Canada: Atlas Instrument Corporation, Ltd., Montreal, Ottawa, Toronto, Vancouver
Export: Frazar & Hansen, Ltd., San Francisco, Los Angeles 6563Y

ence and close association with West Coast telephone operating companies will be of great value during this transition period. He has completed 45 years of service with Stromberg-Carlson's Telecommunication Division, the last 15 years of that period as manager of the West Coast branch. After first spending five years with the company's installation force, he moved into the sales department, traveling the Midwest for 25 years before his appointment as West Coast manager in 1945.

The expanding telephone requirements of the Pacific and Mountain States area during this period were paralleled by a similar expansion of the Stromberg-Carlson branch office and staff. Galligan supervised the branch's move into the greatly enlarged Burlingame facility, from where the company efficiently fills the telecommunication requirements of the 10 Western states, including Hawaii and Alaska.

General Cable Transfers Howard To Chicago Office

CHARLES E. Howard, of the General Cable Research Laboratories, has been transferred to the Chicago telephone sales office for field engineering work.

Howard's experience in the telephone cable field began in 1937 when he first attended postgraduate school courses at John Hopkin's University given jointly by the school and the Bell Laboratories. The courses covered the field of "Outside

CHARLES E. HOWARD

Plant Engineering." He was employed by both the Bell Laboratories and the Western Electric Co. until 1956, when he became associated with the General Cable Corp.

Working at the corporation's research laboratory in Bayonne, N. J., he contributed and assisted in the design and development of long distance toll, coaxial and video pair cables. In recent months he has devoted most of his time to solving many of the problems in the testing and installation of the new aluminum sheathed telephone cables now being used commercially by many telephone companies throughout the country.

Howard's transfer to Chicago will make his services and experience available for field engineering work in conjunction with telephone cable matters. His responsibilities will include field consultation with users of aluminum sheathed telephone cables.

Lynch Communication Names Johnston Marketing Mgr.

THE APPOINTMENT of Harrison Johnston as marketing manager of Lynch Communication Systems, Inc., San Francisco, Calif., has been announced by D. E. Campbell, the company's president.

Johnston's background includes such responsibilities as general sales manager for Ampex Corp. for five years; vice president of Vicon Corp.; and manager, Laboratory Products Section, General Electric Co., Schenectady, N. Y. He was graduated from Princeton University with an engineering degree.

Johnston's appointment as marketing manager will include the duties of sales manager, which were taken over in April from the late E. B. Stone.

Automatic Electric Names Hilton To New Post

R. C. HILTON, formerly senior installation foreman, has been appointed field supervisor for the installation and service department of Automatic Electric Sales, Northlake, Ill. He will have direct supervision of all installation activities for the area

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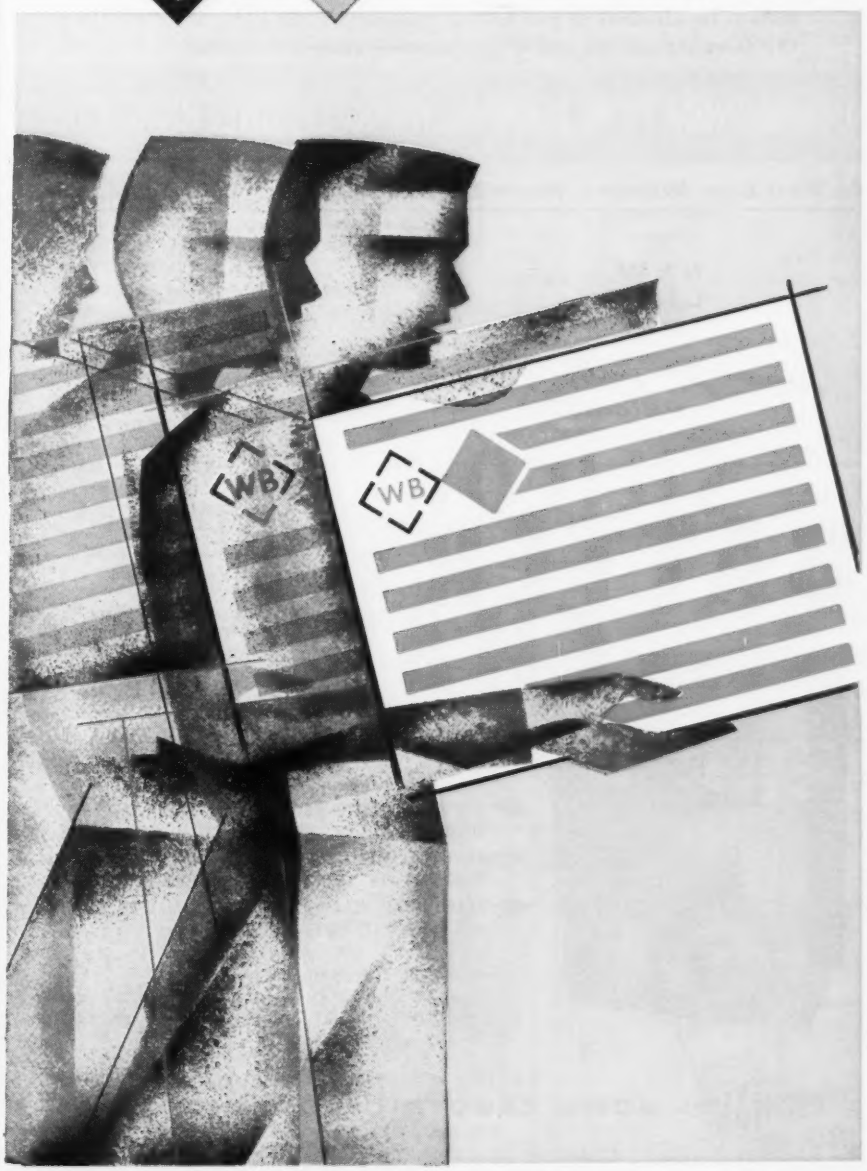

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These assemblies can be equipped with voice frequency coils, Types C632 (88 MH) and C638 (44 MH) coils are for subscriber loading, and Types C642 (88 MH) and C641 (44 MH) coils are for use on quadded inter-office and toll cables. Special coils can be made to meet other requirements.
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served by the southeastern district of AE Sales. This area comprises the states of Ala., Fla., Ga., Miss., N. C., S. C., Tenn., and Va. His headquarters will be in the district office at Atlanta, Ga.

Hilton joined the subsidiary of General Telephone & Electronics in July, 1940 as a junior installer. He was promoted to senior installer in December, 1940. After attending the company's training school in 1941, he was named installation foreman. His responsibilities included supervision of various civilian and military installations during World War II. Hilton was named senior installation foreman in 1945.

Chance Names Martin To Engineering Post

RAYMOND MARTIN has been named chief engineer, distribution and transmission hardware, of the A. B. Chance Co. Martin will be responsible for the design and development groups for anchors, guying equipment, pole line hardware and construction tools in the company's Centralia, Mo. headquarters.

Martin has been a regional engineer for the A. B. Chance Co. for the past 15 months, with offices in Pittsburgh. He had previously held engineering positions with the Duquesne Light Co., Appalachian Power Co. and the Peter Loftus Corp.

Noller Announces New Data Transmission System

ENTRY of Noller Associates Inc., Berkeley, California, into the field of industrial control and communications has been announced by W. E. Noller, president.

This firm will place emphasis on the design and manufacture of electronic systems for data transmission between two or more points. Several such systems, each incorporating advanced solid-state techniques, are now in production. Included are code transmission and telemeter equipment of the ON-OFF, frequency-shift and three-state frequency shift types. An alarm and control system, featuring distributed multistation operation, is another available system.

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SUPERINTENDENT OR MANAGER for the Chapel Hill, N. C. Telephone Exchange. Man must be capable of managing all phases of an independent telephone exchange servicing 8500 subscribers. Telephone engineering training is essential. The position is in the Utilities Department of the University of North Carolina and is covered under the State Personnel system with generous fringe benefits. Write to the Personnel Office, University of North Carolina, Chapel Hill, N. C. Please indicate minimum salary acceptable.

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DESIRE to relocate. Have degree in Business Administration. Experienced in management, construction, maintenance and Dial C. O. Installation. Write Box 120, c/o Telephone Engineer and Management, 7720 N. Sheridan Rd., Chicago, Ill.

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MAGNETO TELEPHONES — Leich 901 wall or desk magneto telephones. Cleaned, tested and guaranteed, $16.50 each. As removed from service $15.00 each. Turtle Lake Tel. Co., Turtle Lake, Wisc.

FOR SALE — 600 line Kellogg two position Masterbuilt switchboard equipped with 460 C.B. and 40 lamp ended magneto lines. Only nine years old in excellent condition. Cook main frame, Flotrol charger and 20 c. Sub-cycle ringer included. Carnegie Telephone Co., Carnegie, Oklahoma. Telephone Olive 4-1002.

KELLOGG UNIVERSAL Switchboard — 2 position 34 cord circuits. Cook Type L Distributing Frame — 750 line terminals 460 No. 100 Protectors. Kellogg Wire Chief Test Cabinet. Raytheon Recticharger Cat. No. 1067B. Mount Horeb Telephone Co., Mount Horeb, Wisc.

80 LINE P.A.X. suitable for factory etc. One 100 line and one 200 line intercept unit. Both units compatible with all makes of equipment. Write for particulars. Switchboard Services, P. O. Box 84, Deerfield, Michigan.

TELEPHONES: Western Electric 302 (251) with 5H Dials, completely reconditioned, neoprene cords, metropolitan plates, new finger wheels and other necessary parts. Ringer frequency S.L., 30, 42, 54 & 66. Satisfaction guaranteed. $7.00 each. Quattlebaum Telephone Supply Co., Bonifay, Fla.

WESTERN Electric Supervisor desires technical position with progressive Independent Telephone Company as Manager, Estimator, Maintenance or Installation Supervisor of COE and Engineer. Thirty-five years experience dial, toll. Box 124, c/o TEM, 7720 Sheridan Rd., Chicago, Ill.

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Parts for Kellogg #1000.
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Sub bases with chrome plungers	1.50 ea.
Handset handles	1.00 ea
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Condensers	1.00 ea
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Receivers	.50 ea
Kellogg dials As removed	
Numbers only	1.00 ea
Numbers and letters	1.25 ea
Kellogg 1100 wall and 1000 desk As removed from service No broken	7.00 ea

Parts for A. E. 40
Cleaned and tested

Cases	2.50 ea
Handles only	1.00 ea
Transmitter and receiver units	.50 ea
Caps	.25 ea
Complete handles	2.00 ea
S. L. Ringers	.50 ea
Condensers Large	.35 ea
Condensers Small	.25 ea
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A. E. Dials As removed.	
Numbers only	1.00 ea
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"CHARLIE," by Jim Counts

TELEPHONE MARKET PLACE

(Continued from page 87)

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Repeater H-61678 Trunk (Pulse) Auto. to Auto. (New)
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Selector H-51223A or D-205179-A (Used-excellent)

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MICHIGAN Tel. Assoc., Grand Hotel, Mackinac Island, Mich., Sept. 12-13.

ROCKY MT. Tel. Assoc., Hilton Hotel, Denver, Colo., Sept. 14-16.

WEST VIRGINIA Tel. Assoc., Morgan Hotel, Morgantown, W. Va., Sept. 19-21.

NEVADA Tel. Assoc., Hotel Nevada, Ely, Nevada, Sept. 21, 22, 23.

NEW ENGLAND Tel. Assoc., Mt. Washington Hotel, Bretton Woods, N. H., Sept. 25-28.

NORTH CAROLINA Tel. Association, Carolina Hotel, Pinehurst, N. C., Oct. 3-4.

NATIONAL CONVENTION, Conrad Hilton Hotel, Chicago, Ill., Oct. 9-12.

SOUTH CAROLINA Tel. Association, Clemson House, Clemson, S. C., Oct. 24-25.

VIRGINIA Tel. Association, Roanoke Hotel, Roanoke, Va., Oct. 27-28.

GEORGIA Tel. Assoc., Biltmore Hotel, Atlanta Ga., Nov. 9-10.

OKLAHOMA Tel. Assoc., Skirvin Hotel, Oklahoma City, Okla., Nov. 9-10.

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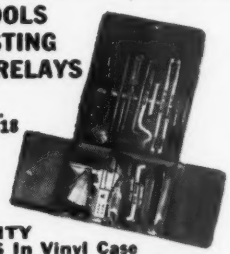

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Everything you need — Thickness Gauges; Spring Tension Gauge; Contact Burnisher; "Relay designed" Wrenches.
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Double Steel Wire Armor, two Layers Jute ....2100 Ft.
26 Pair, #19 Ga., As Above,....14000 Ft. (800 & 500 Ft. Lengths)
51 Pair, #19 Ga. As Above, one length. ....2,000 Ft.
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7 Quad. #19 Ga., Paper Lead 100 M Ft.
7 Quad. #19 Ga., Plastic PVC ....5,300 Ft.
37 Quad. #19 Ga., Paper Lead 1,050 Ft.
51 Pair #19 Ga., Paper Lead ..1,200 Ft. (plus 4 #16 Shielded Pair with poly-eth, insulation) video.
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5 Pair, #19 Neoprene (Latex Ins.) ....50 M Ft.
Spiral 4, 1 Star Quad, #18 Stranded, Neoprene Jacket 3/8" OD, Self-Supporting (also suitable for direct burial) 1320 Ft. Reels with Quick Connector. (6 MH Loading Coils Built Into Connector) ..150 M Ft.

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DRAINAGE COILS, #257A Retard, W. E. $5.00
2 Coils on 19" Mtg. with Protectors $10.00
As Above With Galv. Pole Mtg. Can ..$12.50
PHANTOM COILS, W. E. For Inside or Pole.

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POLAR RELAYS, W. E. #225A, Slightly Used $5.00
(Also 209, 239 and 280 Types) New ..$10.00
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POLE LINE SPECIALS

Cross Arm Braces, 20"-22"	.20
Angle Thimbleye Bolts 5/8x14"	.50
3/4x12"	.50
Lift Plates, 3 Hole 5/8"	.15
Guy Attachments, Chance 158, 5/8" (Similar to Jos. 6500, Hubb. 1100)	.35
Guy Attachments, Strap Type	
1 Hole	.15
2 Hole	.20
Clamps, Ground Rod, Cast Bronze ½" (Sq. Head Set Screw) 200 for	25.00
Machine Bolts 5/8 x 12"	.20
Double Arming Bolt, 5/8" x 12"	.25
½" x 22"	.25
Lay-Cit Grips (for Self-Supp. Cable)	.15
Bridging Connectors, W. E. #2A	.05
Lag Wrench, 4 Way to ¾" Nuts	1.00
Sleeves, Nicopress 1-102-C per C	3.00
Deadend-Off-Set 91-102-C per C	3.50
3-045 .. Per C	2.00
Nicopress Tools, #31-C or CQ	3.50
#17-2	2.00
Grips Wire, Klein 1613-30	2.00
Buffalo, with Double Block	3.00
Transposition Tool (Running bd)	7.50
Cable Car, with Chain & Brake	17.50
Good-Used	10.00
Handline, with Bronze Pulley	7.50
Rings, Cable Hanger, ass't size (Many Other Hardware Items)	

CABLE TEST SETS, Tone, W. E. 1020C, (with 716 Receiver & Exploring) 49.50
Less Exploring Coil 39.50

TRANSMISSION MEASURING SETS

W. E. 13A, Reconditioned $100.00
32A, (Carrier) 100.00
19C Oscillator 150.00
51A Oscillator 100.00
Signal Corps 1-61 Combined Oscillator & Trans. Meas. 100.00
TEST BOARDS: Wire Chief's, with L&N Type U Bridge & Galv. for CB-LB Lines & Trunks with 180 Line Jack Field.
Jacks, Plugs, Test & Patch Cords, Relay Racks, Open & Enclosed.

Telectric Co.

1218 VENICE BOULEVARD (DDD 213) RIchmond 8-2249 LOS ANGELES 6, CALIF.

Transmitter

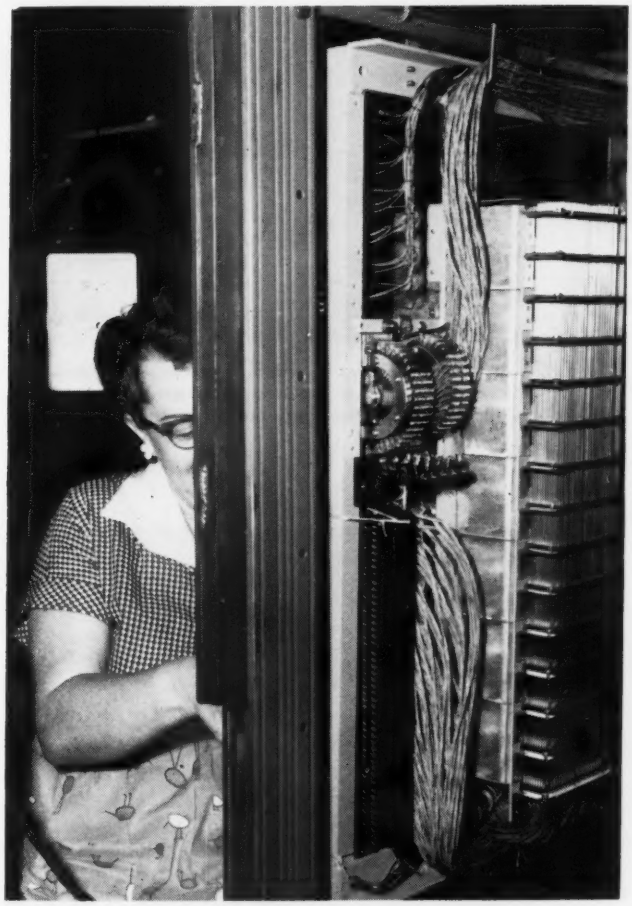
PUBLISHED BY STROMBERG-CARLSON
A DIVISION OF GENERAL DYNAMICS

STROMBERG-CARLSON

News and views of Independent telephone people VOLUME 9, NO. 4 • JULY, 1960

Efficient assembly, geared to soaring demand, produces

New shelf for easier installation and maintenance



A new, compact, dial switchboard equipment shelf is coming off the production lines at Stromberg-Carlson. The shelf permits more efficient assembly techniques and is designed to simplify installation and maintenance.

Retaining the proven effectiveness of the former model, the new shelf benefits from added reliability and stability. A major improvement is point-to-point wiring, which conserves space by eliminating bulky cabling.

This shorter shelf is completely interchangeable with the former model. Among other advantages, the short shelf has made possible the new COMPAK-1, a 100-line community dial office designed by Stromberg-Carlson to extend service to smaller rural areas.

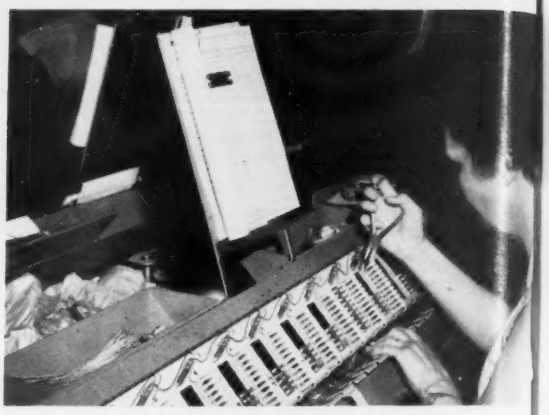
(More on page 2)

Point-to-point wiring simplifies assembly of new shelf and improves reliability. Here a line-finder shelf passes through final wiring stage prior to inspection.

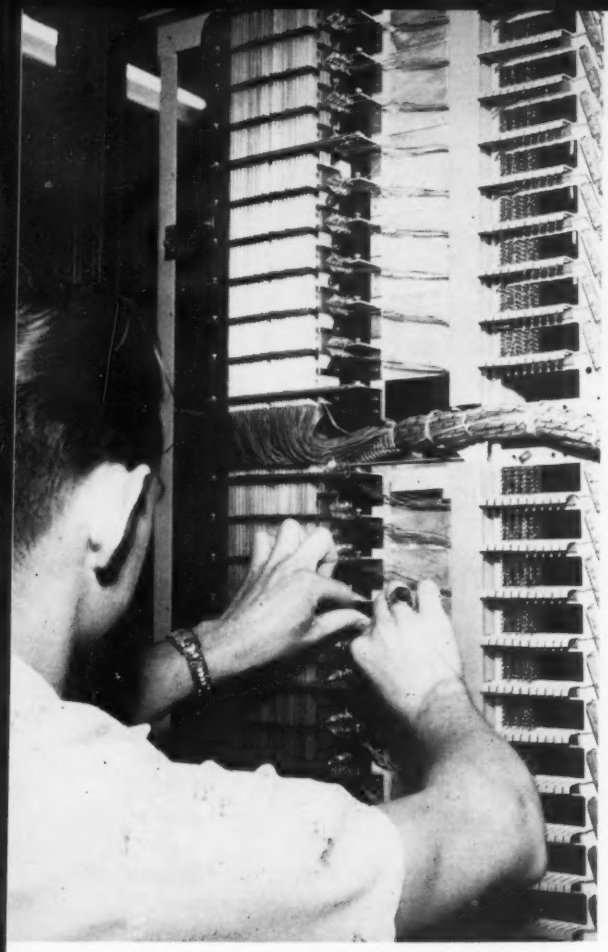
Terminals are put in place on sheet metal member. Precision is important, because plug-in componentry goes here. Round metal guide posts insure snug fit, prevent damage to parts.

Efficient techniques proven in circuit plate production have been incorporated into shelf assembly. Subassemblies were moved to benches to make the operation easier. Wiring of a trunk shelf is shown.

Assembling the new shelf–

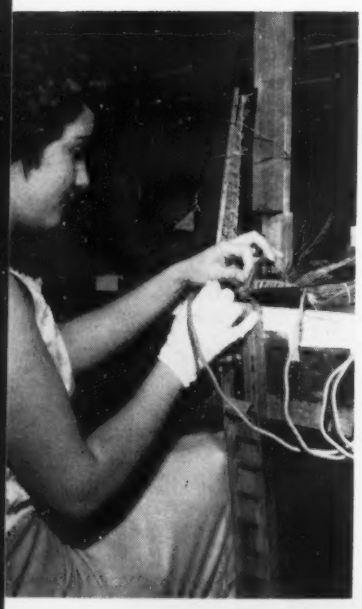


A trunk shelf is wired. Elimination of complicated parts has allowed assembly department to keep pace with the machined parts section, which is working at an increased rate.

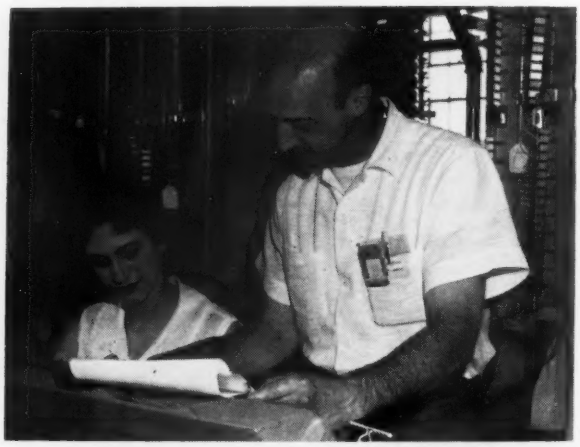


This over-the-shoulder look at a selector wire bank illustrates the compactness of the new shelf design. The new shelves are completely interchangeable with equipment in the field.

A new girl learns the operation from an experienced worker. This stage is final soldering of connector, trunk, and selector shelves, a vital step in reliability.



Here cable connections to wire bank are made with resistance soldering. This method insures a higher reliability of connection.



Supervisor Frank Minardo assists one of the girls in solving a wiring problem on these shorter, sturdier shleves.

Allotter switches for linefinders are wired here. Because subassemblies are brought right to the worker, the operation is smoother.

Another linefinder shelf nears completion. It will then be tested for reliability under conditions more severe than those present in normal field operation. Reduction in the number of parts has enabled inspection to be even more thorough than previously.

PETITE phones

On Their Way!

In all parts of the country, subscriber demand for PETITE phones is making itself known. The enthusiastic response has kept Stromberg-Carlson's instrument production lines busier than ever. Careful packaging in colorful new cartons is the final step before these exciting new phones are shipped to regional warehouses for distribution to you this month.

Try this hair-curling idea to save time at cutover

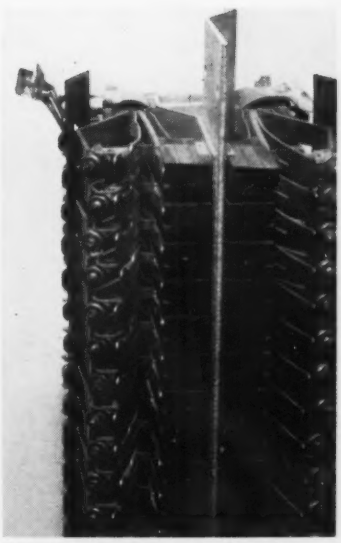
Modern mechanisms have revolutionized the telephone business. But, men, don't kid yourselves — women's intuition still plays its part.

Mrs. Gordon Hughes, vice-president of the Quinlan Telephone Company of Greenville, Texas, watched the time-consuming job of testing out lines prior to cutover at the Alba office. She suggested that, rather than using small plastic strips or toothpicks in the protector pairs, the original long plastic strips be left in place.

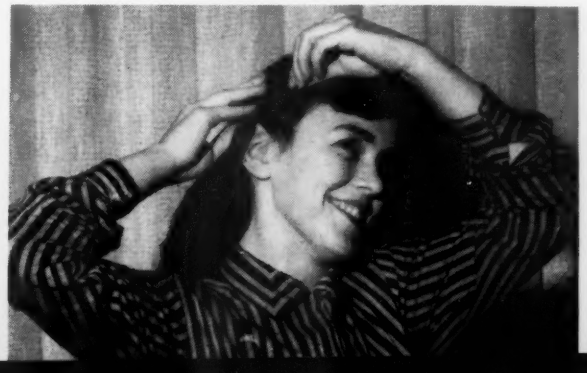
Then hair curlers could be clamped around the cutover strips to connect each line through the dial equipment at the time of testing. This method has been tried on several cutovers with success. It is particularly valuable on large installations.

A few years previous, Mrs. Raymond Young, of the Ganado (Texas) Telephone Exchange, offered a forerunner of the present idea when she removed the paint from two bobby pins and strapped them around the cutover strips.

If man-hours have been climbing at your cutovers, you might try this idea. It's designed to keep the problem "out of your hair."

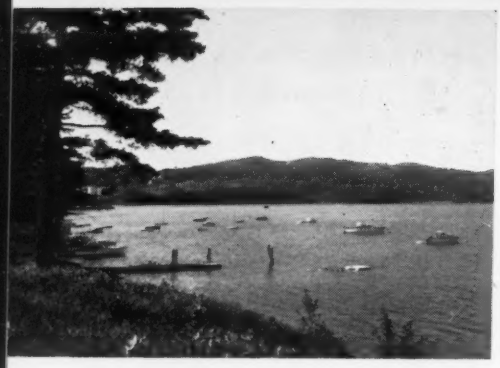


Metal hair curler is positioned as it would be in testing a line. Another curler would be located in corresponding position on tip side of protector. The original cutover strips can be left in place, thus saving valuable time.



Kathleen McElligott, a Stromberg-Carlson employee, demonstrates normal use of these versatile hair curlers. Creative telephone women have suggested ways to make cutovers easier with devices like these.

Advertisement



Sometimes a couple of million dollars rides complacently at home in Westport (N. Y.) harbor. Summer season brings this Lake Champlain town to life, doubles telephone business.

Monument to discoverer of Lake Champlain at Crown Point, N. Y. 1959 marked 350th anniversary of exploration by French adventurer.

The 1959 Postman's Holiday ends where

New England meets New York

Commencement speakers at graduation exercises all over the country have been saying, "This is the conclusion of one phase, but is also the beginning of another." And so with the Postman's Holiday: pleasant memories of 1959 journeyings are still vivid even as letters arrive confirming a schedule for the 1960 summer. One thing is certain . . . no finer group exists than the telephone people we have met on these trips.

The section where New England meets New York — joined rather than separated by Lake Champlain — is reminded by its ageless mountains that the present is never so pressing that it can't be enjoyed and evaluated in terms of the past and the future. We felt this as "Hi" Tomlinson of *East Corinth* walked with us to the top of a knoll overlooking the quiet Vermont village.

"There's something about it that appeals," he said. "Every year some new artists come to paint it; quite often we see it on the better calendars."

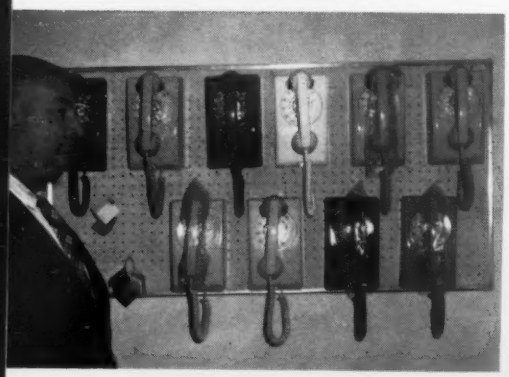
Mr. Tomlinson and Frank Sahlman of the Washington Electric Coop give top-grade XY® Dial service to a group of villages that "were left when the cream was skimmed off" years ago. A few wood-finishing factories, reasonably profitable farms, recently developed ski slopes, and "the people who have always wanted to live in Vermont and now are free to do so" are his customers. He, in turn, is their first selectman.

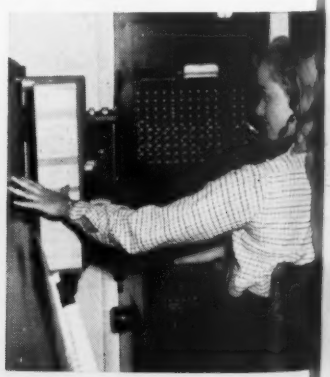
Different is the town of *Northfield*, with the campus of Norwich University on one edge, the famous Rock of Ages granite quarries to the east, and Vermont's capital city, Montpelier, just to the north. George Goodrich, manager of the Northfield Telephone Company, has seen a growth from under 200 to over 1200 subscribers since taking over the reins in 1942. Expansion of the XY Dial exchange literally forced the commercial office out on the street, so a new building next door has been acquired for the business office.

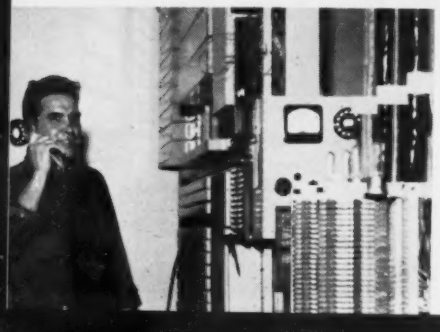
The University has grown in both numbers and quality, so that it is a chief influence in the town's economy and outlook, adding a distinctive flavor as well as steady employment to balance the chief rural occupation of dairying.

From Vermont there are several alternate routes to northeastern New York: by ferry from Burlington to Port Kent, where from the middle

Kenneth Knapp, president of Champlain Telephone Co., with office display of colored telephones . . . . Typically Vermont is the village of East Corinth . . . . Sally Ann Joy, chief operator at Au Sable Forks, where XY Dial, toll board and toll ticketing are planned . . . . Hiram Tomlinson, manager at East Corinth . . . . Family and guests: Mr. and Mrs. George Beckwith of Keeseville, son David and the younger Mrs. Beckwith; Mr. and Mrs. R. Murray Willard of Albany, Mrs. George Forbes of Rochester . . . . New construction at Norwich University has stimulating effect on town of Northfield, Vt. George Goodrich has recently expanded his XY Dial office.







of Lake Champlain you watch the Green Mountains tower up over the stern as the higher Adirondacks slip beneath their foothills dead ahead; or you can cross over at Plattsburg to the thundering drone of reconnaissance planes on 24-hour alert; or you can follow the Grand Isle route until you nudge the Canadian border at *Rouses Point.* This was our destination — one of three exchanges operated by the Champlain Telephone Company.

Rouses Point is an important railroad junction and at present is speculating whether a projected deepening of the Richelieu River flowing out of Lake Champlain to the St. Lawrence will make it a "seaport" and renew the lusty days of the past. The town of *Champlain,* headquarters of the company, already enjoys the benefits of an international gateway — nearly 75 million dollars are collected annually at the border customs posts. A new express highway to Montreal will by-pass the center of town, making it more desirable for those who live there, but the tourist business will still be available; most Canadian drivers, for instance, plan to "gas up" in Champlain. These travelers, happily for the telephone company, invest an amazing amount in long distance calls through the Champlain toll board.

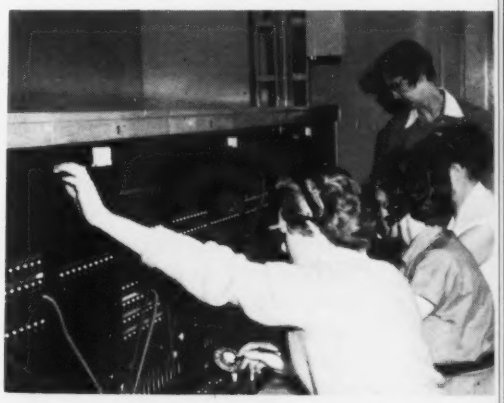
Champlain and *Moers,* the third XY Dial exchange, are centers for a largely agricultural area, but Champlain does have one interesting heavy industry — a plant that makes printing and binding equipment for a large part of the telephone directories in this country and abroad. Dave Southwick, telephone company manager, took us over to this plant as he was discussing an XY-PBX for their increasing communication requirements.

The south-bound tourist usually stops at Au Sable Chasm near *Keeseville.* Even if there isn't time to take the thrilling boat trip shooting the rapids, the view down into the gorge from the bridge or similar vantage point is arresting. This is but one of many attractions that draw thousands of visitors to the area served by George Beckwith and his Au Sable Valley Telephone Company. His lines go clear up to the North Pole (N. Y. version) and service Whiteface Mountain, whose chair lifts carry booted skiers all winter, the silk stocking group all summer. In his territory were 41 first-class motels last year, undoubtedly more by now.

At the time of our visit Mr. Beckwith had converted Keeseville and *Wilmington* to XY Dial; since then has completed plans for a dial office, toll center and XY Toll Ticketing at the *Au Sable Forks* exchange, central in the network. The 2300 subscribers on the books are just a small part of the total number of people who use the service he provides.

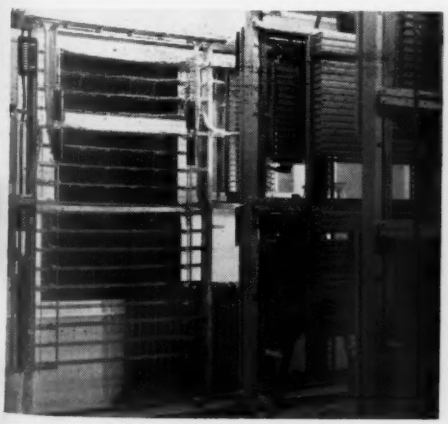
Westport is oriented entirely to the lake (Champlain), and puts off a quiet existence as the summer population moves in with school closing. Some of the boats riding at anchor in its harbor could be traded for a complete telephone exchange, including fixed plant. Gerald Forcier bought this company in 1952 after six years with the New York Telephone Company. Since converting to XY Dial he has been able to attract an additional 300 stations — many

Au Sable Chasm from Montreal highway bridge. Can you see the couple walking the gorge path at right? It would be a long jump.

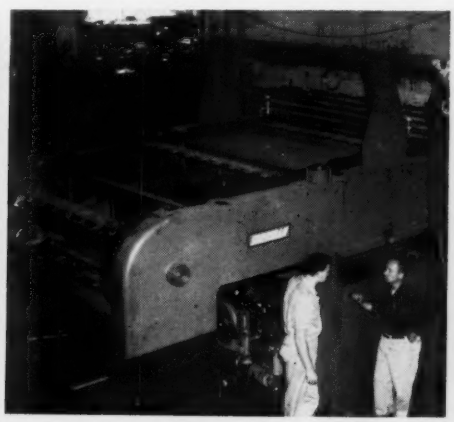


Mrs. Cleora Yakey, chief operator; Brenda Clark, Mona Lane and Elizabeth Gload at busy Champlain (N. Y.) toll board.

Mrs. Lewis of Crown Point brings her garden to the telephone company, where she is office "boss" for manager husband.



XY Dial equipment makes it so easy to take care of the heavy increase in traffic on certain lines during the rush of summer activity at Westport.



This machine may now be binding your telephone directory. It's made in Champlain, N. Y. Increasing business nationwide made a modern XY-PBX essential here.

Anson Bonbard, Margaret Thompson, Connie Martineau, and Veronica Murphy (out banking the cash) run efficient business office at Keeseville headquarters of Au Sable Tel. Co.

Canadian border to North Pole

New lines for Champlain Tel. Co. Jim Trow, construction foreman, Arnold Beal and Pete Dumas meet Dave Southwick, manager, at construction site.

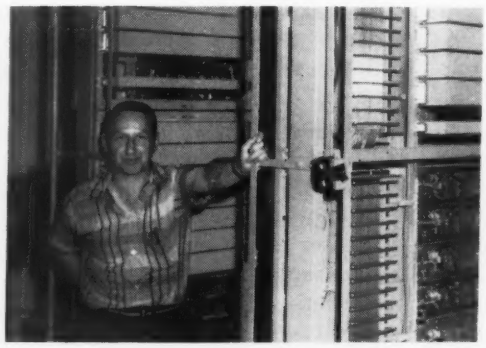
from people who were unwilling to take service until they could get the quality they now are receiving.

Almost at the head of the lake is *Crown Point*, known to every student of history as strategic to north-south passage. Last July the town celebrated the 350th anniversary of the first landing by Samuel de Champlain in 1609. This original French village and fort soon had 2,000 inhabitants — by far the principal settlement in the region in those days. Later the area became known for its iron production, as well as lumber; today there is a very valuable iron deposit in the vicinity, and the pulp mills at Ticonderoga furnish work for many who prefer to live in Crown Point.

Mr. H. O. Lewis acquired the telephone company in 1954, converted to XY Dial four years later. For 18 years previous he had built long lines for A. T. and T. Co. from Maine to Florida. "At Eastport, Maine," he told me, "I had to eat lobster every day; it was all I could afford!" Now he eats plainer food, but is glad to be home again.

And the following day, your editor and Mrs. Forbes could also say, "This has been wonderful, but now we're home again for another year."

This show horse, owned by manager of East Corinth mill, has won three cabinetsful of cups and ribbons.



Equipment could grow, but not building, so George Goodrich of Northfield, Vt., moved business office next door.

You can drive to this North Pole, near George Beckwith's Wilmington exchange; thousands do each year.

Here's where you can see XY Toll Ticketing at work

Interested in Direct Distance Dialing? If so, you can get a firsthand look at how it operates at any of the 41 offices listed below. Each installation uses Stromberg-Carlson XY Toll Ticketing equipment, featuring the exclusive magnetic tape recorder, to supply top-quality DDD service to subscribers. Check the list for the office nearest you. Plan to see XY Toll Ticketing in action soon.

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- Courtland
- Elk Grove
- Manteca
- Sanger

Florida
- Leesburg
- Mt. Dora

Ohio
- Aurora
- Bainbridge
- Chardon
- Elyria
- Hiram
- Hudson
- Newbury
- Northfield
- Russell
- Twinsburg
- West Richfield

New York
- Westfield

Louisiana
- Carlyss

Washington
- Everett
- Kalama
- Lynden
- Mt. Vernon

Oregon
- Creswell
- Redmond
- Sheridan
- White City

Pennsylvania
- Chambersburg
- Hanover
- Leechburg
- Kittanning

Indiana
- Franklin
- Plymouth
- Warsaw

Nevada
- Henderson

Illinois
- Dixon

Maryland
- Ft. Meade — NSA & main post

Virginia
- Manassas

Nebraska
- Scottsbluff

Iowa
- Creston

The following are some of the offices scheduled for XY Toll Ticketing later this year.
- Ocala, Florida
- Exeter, California
- Bakersfield, California
- East Pembroke, N. Y.
- Fordyce, Arkansas

Transmitter
GEORGE B. FORBES, Editor
J. T. LONG, Associate

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Advertisement

ADVERTISERS' INDEX

Acme Electric Corp. 86
Advertising Council 38
Airtronics International Corp. 40
Altec Lansing Corp. 69
American Chain & Cable Co. (Wright Hoist Div.) 75
Anaconda Wire & Cable Co. 2-3
Associated Engineers, Inc. 90
Automatic Electric Co. 6-7, 18-19, 50-51

Bashlin Co., W. M. 88
Benner-Nawman, Inc. 75
Berry & Co., L. M. ..... Inside Front Cover
Bishop Mfg. Corp. 83
Buckeye Telephone & Supply Co. 75, 88
Budelman Electronics Corp. 11

Collins Radio Co. 57
Commercial Cord Co., Inc. 88, 98
Communication Equipment & Engrg. Co. 86
Copperweld Steel Co. 25
Crane, Inc., Carl C. 90

Davis Construction Co. 90
Davis Manufacturing, Inc. 71
Dial Haven, Inc. 88
Dillon & Co., Inc., W. C. 77
Donnelley & Sons, R. R. 77

Fitchburg Engrg. Corp. 78
Floor-Con 72

Galv-Weld Products 89
General Insulated Wire Works, Inc. 64
General Telephone Directory Co. ..... 88, Back Cover
Greenlee Tool Co. 14

Hallamore Electronics Co. 82
Hamilton Associates, Inc., Allen K. 90
Henkels & McCoy 89
Highway Trailer Co. 88
Holan Corp. 34

Indiana Steel & Wire Co., Inc. 97

Kellogg Swbd. & Supply Co. 32-33
Keystone Steel & Wire Co., Inc. 23
Klein & Son's, Mathias 58
Koppers Co., Inc. 89

Leich Sales Corp. 61, 62
Lorain Products Corp. 21

Mathews Co. 88
McCabe-Powers Body Co. 65
McGrath Engineering Co. 90
Morrison-Pelsue Co. 72
Murphy Engrg. Laboratores, Inc. 90

Natco Corp. 78
Neuses, Inc., P. K. 90
North Electric Co. 4-5

Okonite Co., The 77

Page & Hill, Inc. 67
Panhandle Electric Sales, nc. ..... Inside Back Cover
Parsons Co. 80
Phelps Dodge Copper Prducts Corp. 12-13
Piedmont Wood Preservin Co. 89
Pitman Manufacturing Co 8, 9, 10
Puregas Equipment Corp. 15

Radiation, Inc. 35
Reliable Electric Co. 89
Reynolds Metals Co. 26
Rolatape, Inc. 66
Runzel Cord & Wire Co., Inc. 68, 88

S & G Manufacturing Cor 81
Semco Sales & Service, Inc. 59
Sherron Metallic Corp. 88
Sierra Electronic Corp. 84
Sloan, Cook & Lowe 90
Stewart Bros. 60
Stromberg-Carlson 36-37, 91-96
Superior Cable Corp. 79
Suttle Equipment Corp. 29
Switchboard Services 89

Taylor-Colquitt Co. 59, 89
Telectric Co. 90
Telephone Equipment, Inc. 87
Texas Creosoting Co. 89
Thornhill Publishing Co. 64
Transandean Associates 39
Tudor & Yager 90

U. S. Motors Corp. 63
U. S. Steel Corp. (AS&W) 81
Utility Tool & Body Co. 89

Whitney Blake Co. 85
Williams Inspection Co., Inc., A. W. 90
Winders & Geist, Inc. 16

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HTL-195

EXTRA HIGH-TENSILE TELEPHONE LINE WIRE

for low-cost Rural Lines

• Spans up to 600 feet in Heavy Loading, 650 feet in Medium Loading and 700 feet in Light Loading districts are possible where Crapo HTL-195 is employed. This extra long span construction results in marked savings in costs per mile of line. Pole structures can be reduced to a minimum. Fewer pole structures mean substantial savings both in materials and man-hours of labor. There is less hauling to be done, fewer holes to dig, less material to be handled, installed and connected.

Improved electrical qualities make practical typical subscriber loops of 14 to 15 miles with normal voltages and equipment. Also can be used for subscriber carrier.

Write for Engineering Manual No.TM-59

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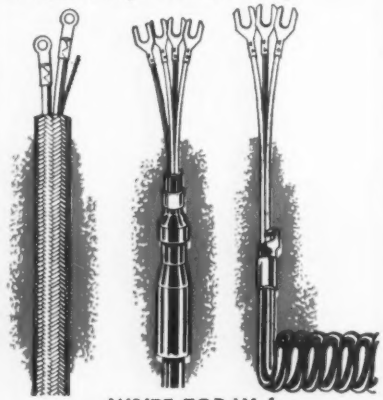
COMCO CORDS
NEVER LET YOU DOWN!

...and that's no joke where phone cord serviceability is concerned

Whether it is a handset, deskstand, switchboard, or inter-communication system cord, COMCO quality guarantees top year-in, year-out performance. From rugged Spiraflex Retractile cords in standard or extended lengths (10, 15 or 25 ft.) with black or colored P.V.C. jackets, to durable Nylon jacketed Operator cords, in black or brown, each COMCO Cord boasts built-in reliability to eliminate service worries. Moreover, all standard cords are in stock, ready for rapid delivery on your order!

Special cords a COMCO specialty, too!

Patch cords, transmitter cords, test and inter-communication cords are all quickly available from COMCO, and cords made to your exact specifications require little more than an immediate delivery schedule. Determining the exact time required for delivery of your problem cord takes only a call to COMCO. Why not make it today?



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THE BACK OF THE BOOK

By JOHN G. REYNOLDS

Adlai's A Stranger To Phone Girl

LAST MONTH *The New York Times* asked a telephone operator at Libertyville, Ill., for the home number of Adlai E. Stevenson in that city of 5,400 population.

"How do you spell the name?" she asked.

The *Times* reporter spelled the name and asked, "Didn't you ever hear of Adlai Stevenson?"

"No sir," she replied.

"Why, he was governor of your state from 1949 to 1953, and ran for President twice. Whom did you vote for in 1952 and 1956?"

"There is no telephone listed for Adlai E. Stevenson in Libertyville," the operator said coldly, closing the conversation.

The number, appropriately enough, is private.

Surcharge Attracts The Unlisted

IN New York City a 50-cent monthly surchage on unlisted numbers has brought 25,000 hitherto anonymous subscribers into the pages of the new Manhattan telephone directory. According to a *New York Telephone Co.* spokesman, this accounts for much of the directory's increased size. It has grown by 27,000 names and 36 pages.

The surcharge was imposed last year to discourage unlisted numbers, which, it was explained, increased the cost of operations.

The new book has a grayish green cover, contains 795,000 names, 1,180 pages and weighs four pounds, eleven ounces. . . .

The abandonment of exchange names (BUtterfield 8, RHinelander 4) for their initial letters (BU 8, RH 4) shows up markedly. Two new exchanges that could not initiate any recognizable name — TT 5 and LF 3 — make their debut.

For The Birds

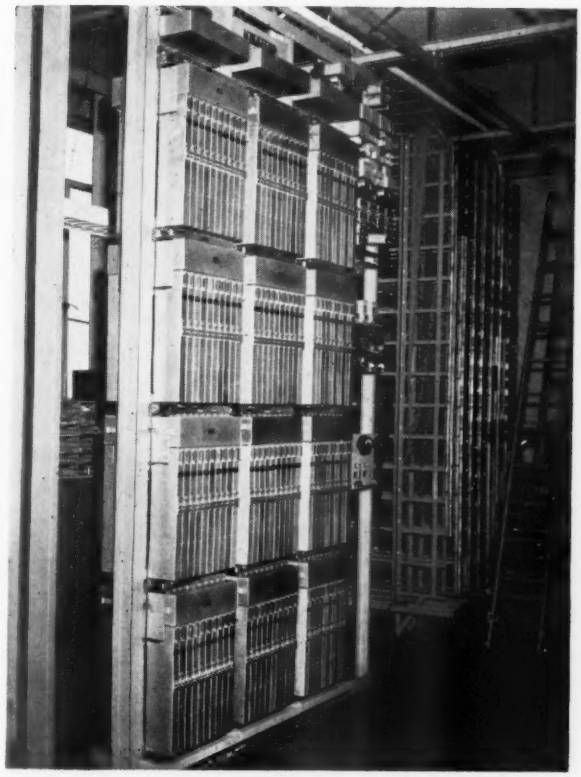
ANOTHER story concerning a request for an extension in an unusual place has turned up. This time the customer wanted a telephone installed in a pigeon coop.

It seems the man's hobby is racing homing pigeons. The birds are released at a distant point, and they fly back to their home coops as fast as they can. Since the first pigeon back home is the winner, split-second timing of the race is a must.

The customer explained he sometimes gets a call from another racing enthusiast to find out if his flight has returned. Several times his birds have come back while he was gone to answer the telephone, and he's missed the exact arrival time — costing him the race.

With the newly installed extension in the pigeon coop, he can talk and time the flights at the same time. Result: a happier pigeon fancier with more frequent winners.

PANHANDLE
TRANSISTORIZED "X" CARRIER SYSTEM



Check the signaling features for only Panhandle type "X" transistorized angular modulated cable carrier offers a simple and economical approach to them all.

1. **Ringdown.**
2. **E/M two wire or four wire.**
3. **Loop dial reverse battery (Direct selector level—selector for terminal or tandem office operation).**
4. **Simplex—two way (T/R and dial leg) operator office trunks (CLR and toll switch).**
5. **Foreign exchange service and PBX trunks.**
6. **PABX trunks with premonitory busy.**
7. **Operational special feature marking.**
   - **A. Automatic toll ticketing identification marking.**
   - **B. Controlled ring and rering.**
   - **C. Pay-station collect and refund.**

Panhandle auxiliary signal tone equipment makes available to the industry the first economical approach to multi signal carrier channels to provide unlimited control and marking features.

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644 BRANIFF BLDG.
DALLAS 35, TEXAS TEL. # FL7-8353

For information and engineering assistance with your trunk signaling applications call or write to the above.

TECHNICAL SUMMARY

Voice frequency input level	4-wire operation — —16 dbm 2-wire operation — 0 dbm
Voice frequency output level	4-wire operation — +7 dbm 2-wire operation — —2 dbm or —4 dbm (with resistance hybrid and compromise network)
Normal HF channel transmitting level	—20 dbm
Maximum repeater gain at 336KC	20 db
Mean average noise for a 20 channel system contributed by terminals and repeaters using FIA weighting at 2-wire drop with filtered 48 VDC battery.	20 dba
Drop level stability (1) Properly engineered systems (2) Battery supply does not have variations exceeding ±5%	±.2 db
High frequency input-output impedance	135 ohms
Power requirements 20 channel terminals complete with 12 repeaters, one-way	4.15 amp. (maximum connectable load)
Channel audio response	300 to 3000 CPS to 3db points
Channel Modulation Index	5 radians at 1000 cps 0 dbm — 2-wire drop —16 dbm — 4-wire drop
Mounting Dimensions: Master oscillator or distribution amplifier (normally one per bay front mounted only)	4 rack spaces — 7 inches
"A" Group — 10 channels	17 rack spaces — 29¾ inches
"B" Group — 10 channels	16 rack spaces — 28 inches
"A" & "B" Groups — 20 channels	33 rack spaces — 57¾ inches

Let our "Revenue Men" show you

THE MEANING OF DIRECTORY COOPERATION!

Take a man like

Arvel Phillips

Arvel is one of our "revenue men" in Herrin, Illinois.

He attended Southern Illinois University in Carbondale, and later served as principal of the elementary school in Benton, Illinois.

After a hitch in the Coast Guard from 1942 to 1945, Arvel returned home and began his career in sales.

It was in 1952 that he joined the General Telephone Directory Company as a sales representative in our Herrin Unit. In 1954, he was promoted to supervisor.

He, his wife and his 13-year-old son make their home right in Herrin. When Arvel is not working, he spends most of his time outdoors. His hobbies are baseball, golf, boating, hunting and fishing. He puts his sports knowledge to good use in his work with the Boy Scouts, home town boys' baseball teams and Church youth groups.

Arvel Phillips is a good example of the "revenue men" who work for General Telephone Directory Company and for you. Men who are an asset to any community in which they live.

You get more than extra sales when you put one of our "Revenue Men" to work on your directory.

His manners, his methods will be a positive credit to your company. He'll be welcomed by your advertisers.

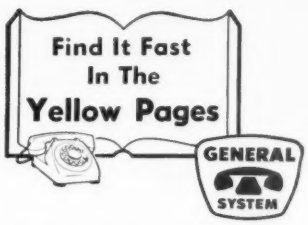
He'll work together with you to produce a book you can be proud of. A directory with complete Yellow Pages service—showing the public where to go for all kinds of purchases, rentals and services. A directory with maximum accuracy, maximum revenue.

And you won't have a worry in the world. Selling, publishing and printing are all done to perfection as part of our Complete Directory Service Plan.

Want to know more about it? A phone call or letter to our nearest office will bring a representative on the double.

GENERAL TELEPHONE DIRECTORY COMPANY

1800 Oakton Boulevard
Des Plaines, Ill.
VAnderbilt 7-6111



DIVISION OFFICES:

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Fort Wayne, Ind. • Honolulu, H. I. • Lexington, Ky. • Long Beach, Calif.
Madison, Wis. • Manila, P. I. • Muskegon, Mich. • St. Paul, Minn.
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